the OIL AND GAS JOURNAL

Hughes Bit "Warehouses" Will Travel 10 Million Miles This Year

The important thing about this record mileage is the service it represents—

—having the right rock bits on your rig at the right time!

There are approximately 200 Hughes mobile "warehouses" serving over 2700 active drilling rigs in the United States and Canada. They are constantly on the move from Hughes' 150 strategically located stocking points to the drilling rigs.

Each trip to each rig is planned so the right bits will be available on the rig floor as needed.

This is possible because Hughes field service representatives are intimately familiar with drilling conditions and bit requirements of their respective areas.

HUGHES TRI-CONE® ROCK BITS

PRICE 50 CENTS TABLE OF CONTENTS PAGE 103 NOVEMBER 15, 1951

THE ROCKWELL
INTEGRATOR

Calculates CHARTS
WITH MACHINE PRECISION

. . . WITH LESS MAINTENANCE, LOWER COSTS

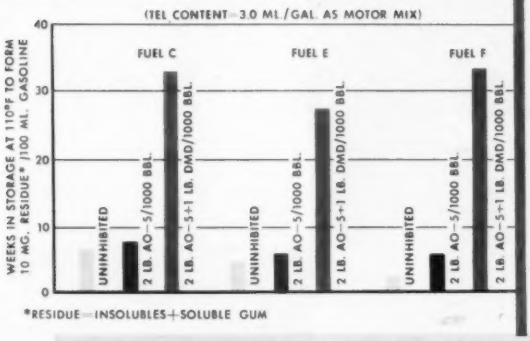
Set your sights high and you'll look at a Rockwell orifice meter. You will see a design with stronger parts, better construction. For example, Rockwell orifice meters have a new Teflon bearing stuffing box. This unit never leaks, never needs lubrication. They have positive inking pens that eliminate blurred or unprinted records.

Consider, too the advantage of a unit manometer construction that permits you to interchange high side chambers at will and adapt any range meter to higher or lower differential requirements. This feature can save you plenty on your inventory of complete meters.

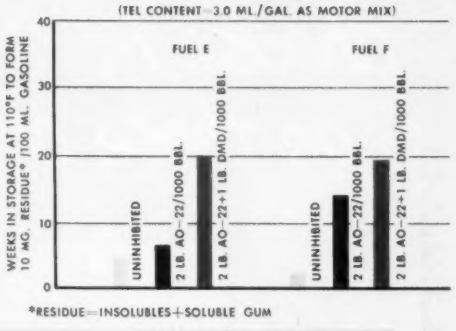
You'll also save plenty on routine maintenance, for the Rockwell meter can be disassembled with the simplest tools. Now's the time to look into all the advantages of this superior design. Write the nearest Rockwell office for eye-opening information.

ROCKWELL MANUFACTURING CO.
PITTSBURGH 8, PA.—Atlanta • Boston • Chicago • Columbus
Houston • Kansas City • Los Angeles • New York • Pittsburgh
San Francisco • Seattle • Tulsa

EFFECT OF DU PONT METAL DEACTIVATOR IN COMBINATION WITH ANTIOXIDANT No. 5 IN 3 GASOLINES


(TEL CONTENT—3.0 ML./GAL. AS MOTOR MIX)
WEEKS IN STORAGE AT 110°F. TO FORM 10 MG. RESIDUE* /100 ML. GASOLINE
FUEL C
FUEL E
FUEL F
UNINHIBITED
2 LB. AO—5/1000 BBL.
2 LB. AO—5+1 LB. DMD/1000 BBL.
*RESIDUE—INSOLUBLES+SOLUBLE GUM

EFFECT OF DU PONT METAL DEACTIVATOR IN COMBINATION WITH ANTIOXIDANT No. 22 IN 2 GASOLINES


(TEL CONTENT—3.0 ML./GAL. AS MOTOR MIX)
WEEKS IN STORAGE AT 110°F. TO FORM 10 MG. RESIDUE* /100 ML. GASOLINE
FUEL E
FUEL F
UNINHIBITED
2 LB. AO—22/1000 BBL.
2 LB. AO—22+1 LB. DMD/1000 BBL.
*RESIDUE—INSOLUBLES+SOLUBLE GUM

COMPOSITION, COPPER CONTENT, AND DEACTIVATOR RESPONSE OF TEST FUELS CITED

FUEL COMPOSITION

	Composition, vol. %		
	Fuel C	Fuel E	Fuel F
Catalytic cracked gasoline	30.0	46.0	75.0
Thermal cracked gasoline	13.4	32.0	5.0
Straight run gasoline	56.6	22.0	—
Natural gasoline & light ends	—	—	17.0
Thermal reformed gasoline	—	—	3.0
Copper content p.p.m. by wt.	0.04	0.03	0.05

INDUCTION PERIOD RESPONSE TO METAL DEACTIVATOR

Metal Deactivator Concentration, wt. %	Induction Period, min.		
	Fuel C	Fuel E	Fuel F
None	1078	404	971
0.0001	1159	398	1036
0.0003	1174	407	1035
0.0005	1171	406	1029
0.0008	1170	401	1030

DUPONT METAL DEACTIVATOR STEPS UP STORAGE STABILITY OF MANY GASOLINES

There is a good chance that copper is present in your gasoline whether any of the components have been copper sweetened or not. Recent tests at the Du Pont Petroleum Laboratory, for example, show that 64 out of 91 samples of gasoline components tested contained copper.

Since an antioxidant alone does not always provide the required stability over extended storage periods when copper is present, the use of an economical additive such as Du Pont Metal Deactivator *in conjunction with the antioxidant* is recommended.

The above data illustrate the point. As the charts show, with only 1 lb. of Du Pont Metal Deactivator per 1000 barrels added to antioxidant inhibited gasolines stored at 110° F., the stability period increased from 6-8 weeks with antioxidant alone, to 28-34 weeks with Metal Deactivator added, before reaching a 10 milligram residue level.

If you are interested in insuring the storage stability of your gasoline at a minimum cost, we suggest, for more accurate results, you use storage tests rather than accelerated tests to determine the value of Du Pont Metal Deactivator combined with Du Pont Antioxidants in your stocks.

For samples or further information get in touch with your Du Pont representative.

DU PONT
REG. U.S. PAT. OFF.

Better Things for Better Living . . . through Chemistry

Petroleum Chemicals

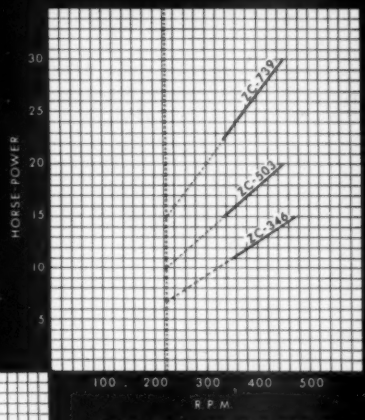
E. I. DU PONT DE NEMOURS & COMPANY (INC.)
Petroleum Chemicals Division • Wilmington 98, Delaware

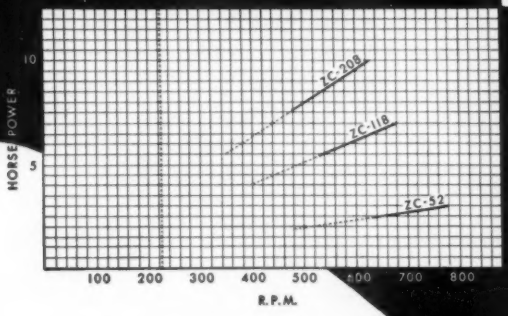
District Offices: New York, N. Y. · Chicago, Ill. · Tulsa, Okla. · Houston, Texas · Los Angeles, Calif.

District Laboratories: Wilmington, Del. · Chicago, Ill. · Tulsa, Okla. · Houston, Texas · El Monte, Calif.

IN CANADA: Canadian Industries Limited—Toronto, Ont.—Montreal, Que.

Choose it on these charts...





RATED HP. CURVES FOR CONTINUOUS HEAVY DUTY SERVICE

(Gas or Gasoline)

Recommended continuous hp. for each size engine is shown by the combined dotted and solid graph line which represents the governed engine speed range for continuous service.

Hp. ratings are for heavy-duty continuous service. Maximum hp. ratings are not shown. Highest speed shown for each size is for heavy-duty pumping service, and in every instance is less than 900 f.p.m. piston speed.

To realize the full advantages of ample flywheel effect, it is best to select the engine to operate at the higher speeds indicated by the solid graph line.

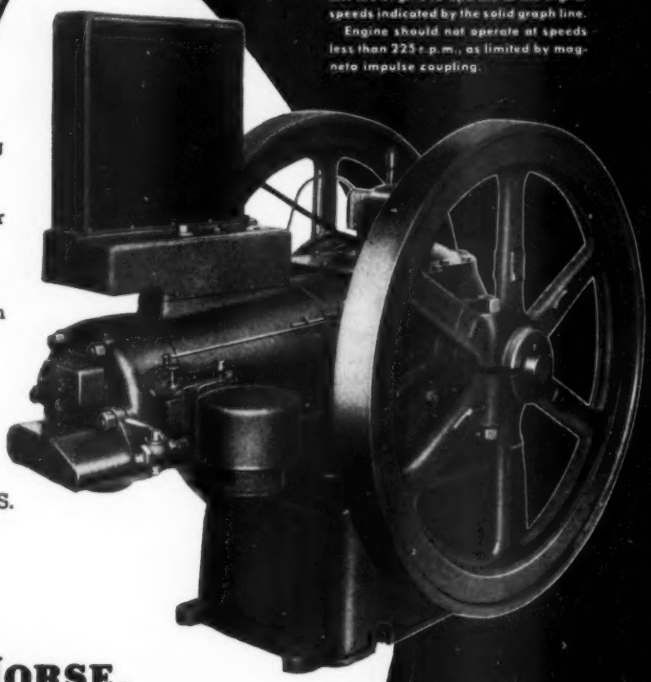
Engine should not operate at speeds less than 225 r.p.m., as limited by magneto impulse coupling.

...and be right!

When you choose a Fairbanks-Morse "ZC" Engine for your pumpers, you're not guessing about horsepower ratings. For "ZC" engines are *not* rated by maximum horsepower . . . they *are* rated by horsepower for *continuous heavy-duty service.*

Fairbanks-Morse conservative ratings give you the data from which you can select with safety, knowing that there is an ample reserve to meet the momentary peak loadings you will encounter.

For the complete story on the "ZC" . . . the engine with the *big double wheels* . . . see your local supply store or write Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago 5, Ill.

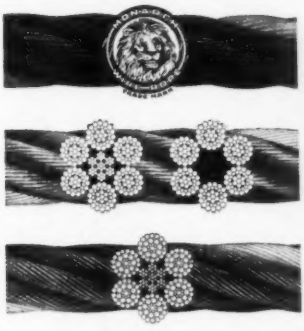


FAIRBANKS-MORSE,

a name worth remembering

OIL FIELD EQUIPMENT • PUMPS • SCALES • ELECTRIC MOTORS • GENERATORS • LIGHT PLANTS • DIESEL, DUAL FUEL AND GASOLINE ENGINES • MAGNETOS • DIESEL LOCOMOTIVES

MACWHYTE

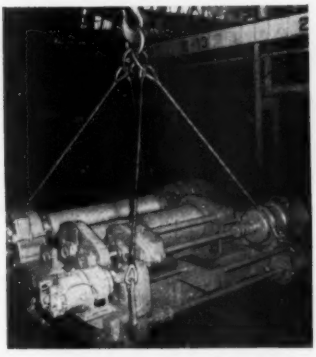


PREformed
INTERNALLY LUBRICATED

WIRE ROPE

for cranes, hoists, elevators, and all equipment

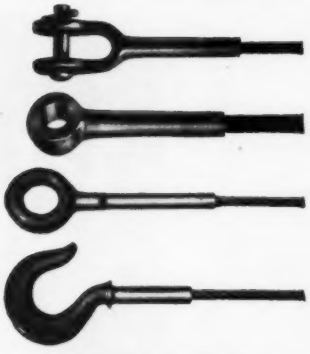
From Macwhyte's complete line of a thousand and one sizes and types, you get rope best suited to your equipment, thoroughly lubricated, designed, and PREformed to provide long, safe service.



WIRE ROPE SLINGS

for lifting and moving materials, equipment in production or maintenance

There are hundreds of types and sizes of Macwhyte Flat-Braided, Round-Braided, Single-Part, and Grommet Slings. All are custom made in length, capacity, and flexibility to meet your needs.

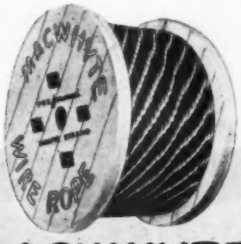


WIRE ROPE ASSEMBLIES

for machine parts, controls, and operating devices

These Macwhyte Safe-Lock wire rope assemblies are made to order in length, strength, and flexibility desired. Terminals are permanently attached to one or both ends. There are many standard types.

Catalogs available on request. Write Macwhyte Company, 2916 Fourteenth Ave., Kenosha, Wisconsin.



MACWHYTE COMPANY
KENOSHA, WIS.

Mill depots: New York
Pittsburgh • Chicago
Minneapolis • Fort Worth
Portland • Seattle
San Francisco • Los Angeles.
Distributors throughout U.S.A.

10115W

SELL AS YOU SHIP

with RHEEMCOTE drums

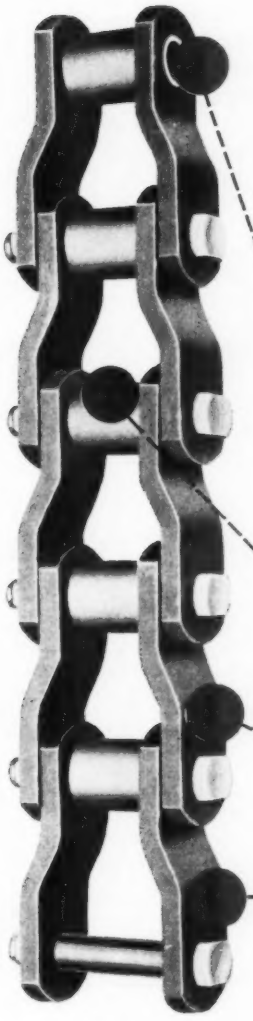
Rheemcote shipping containers are also **selling containers!** Beautifully lithographed in any colors, any design, they promote your product and name wherever they go. Use this powerful new advertising medium. Write—
Rheem Manufacturing Co.
570 Lexington Avenue
New York 22, N. Y.

RHEEM

MANUFACTURING COMPANY

Link-Belt SS-40 Hyper

THE LONG LIFE ROTARY CHAIN



SS-40 Hyper
A. P. I. 3.

It isn't chance that delivers the kind of chain you need for high rotary speeds—it's advanced engineering and manufacture. Every piece of Link-Belt A. P. I. Chain is built to meet these requirements.

BUSHINGS Machined alloy steel—case hardened for greatest wear resistance—ground internally and externally to precision accuracy.

ROLLERS Alloy steel—heat treated for maximum wear resistance; shot peened for greater fatigue life; close tolerances for smooth, easy movement.

PINS Forged alloy steel, precision ground, cadmium plated.

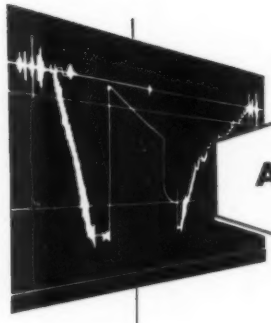
SIDE BARS Selected alloy steel—heat treated. Pitch holes finished to precision limits with size and pitch accurately controlled.

LINK-BELT COMPANY
Indianapolis 6, Dallas 1, Houston 1, Los Angeles 33, New York 7. Distributors in all fields.
12.401

LINK-BELT

CHAINS and SPROCKETS

The Oil and Gas Journal, published Thursdays by The Petroleum Publishing Company. Entered as second-class matter September 1, 1910, at post office at Tulsa, Okla., under act of March 3, 1879. U. S. and foreign rates to the petroleum industry, $3 yearly. Copyright 1951.



B.T.'s Greater Accuracy in Pressure Recording

one of many reasons why HALLIBURTON'S *best* . . . for your DRILL STEM TEST!

You get far greater accuracy from the Bourdon Tube Pressure Recording Device—and only Halliburton has it!

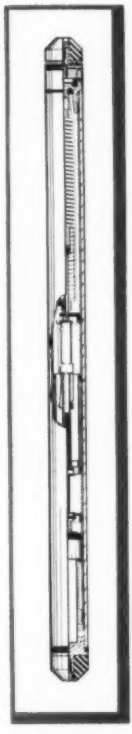
The absence of packing glands in the Bourdon Tube makes it much more sensitive to slight variations of pressure than other types. In many wells this super-sensitive instrument has made an important difference in the Test report. Operators who know about it won't have anything else.

The Bourdon Tube is a part of every Halliburton testing string. So is Halliburton's Standard Pressure Recording Device. You get *both* records—immediately after the test—*at no extra cost!*

B.T's pressure recording is reproduced photographically—*not* by hand—which eliminates the chance of human error. It is first calibrated by Halliburton's field unit, a unit kept precision accurate through regular checks by the traveling laboratory. Then the original B.T. recording is sent back to Halliburton's home laboratory for a thorough double-check. You get this original within 7 days in a complete folder—the most accurate pressure recording modern science can make.

No other testing service can give you this greater accuracy in pressure recording—for Halliburton *alone* offers you the Bourdon Tube. It is one of the many reasons why Halliburton's best for your drill stem test. Get this greater accuracy, and other exclusive Halliburton features, on your next test.

HALLIBURTON OIL WELL CEMENTING COMPANY, DUNCAN, OKLAHOMA



Other Reasons Why **HALLIBURTON'S** *best:*

25 YEARS RESEARCH BACKS UP YOUR TEST

Halliburton *alone* offers a testing service developed and improved by 25 years of energetic, grass-roots research.

MOST ADVANCED TOOLS AND TECHNOLOGY

Halliburton's highly specialized tools and exclusive features, its superior knowledge and experience, help make misruns a rarity.

YOU GET REAL PERSONAL SERVICE

Your Tester stays on the rig from start to finish of your test—giving you his full-time attention during this highly important operation.

YOU'RE ONLY MINUTES AWAY

Halliburton has hundreds of highly-trained Testing Specialists experienced in every type of well. One of these Testers is only minutes away.

YOU'RE SURE IT'S AVAILABLE

Each Halliburton Tester is completely equipped with the latest tools and ready to go as soon as you call. Phone him before you come out of the hole.

HALLIBURTON ★ ***YEARS AHEAD IN DRILL STEM TESTING!***

4" and 8" a.c.f. Lubricated Plug Valves handling premium and regular-grade gasoline at Shell Oil Company's Wilmington, N. C., Marine Terminal.

NO 'BRAKES' ON FLOW

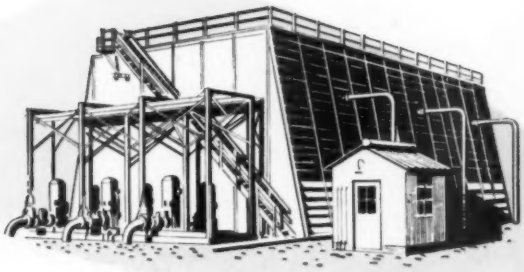
Filling or emptying... small storage tank or huge tanker... lading flows faster through a.c.f. CYLINDRICAL Lubricated Plug Valves. The passage through the valve does not slow the flow, since it has at least as much area as the pipe. There is no 'throttling' effect with a.c.f. Valves!

a.c.f. CYLINDRICAL FULL PIPE AREA **PLUG VALVES**

Representatives in 50 Principal Cities

Ask for Catalog 4-OG, American Car and Foundry Company, Valve Division, 1501 East Ferry Avenue, Detroit 11, Michigan

For day in, day out *dependability*—you can't beat a



BJ VERTICAL COOLING TOWER PUMP

FOR REFINERY OPERATION — these pumps have what it takes to handle 'round-the-clock, seven-days-a-week, 52-weeks-per-year pumping! Because they are *BJ engineered*, you can be sure they'll measure up to your cooling tower requirements. Because they are *BJ built*, you can be sure of steady-going, low cost operation that won't let you down.

These are some of the features that make BJ Vertical Cooling Tower Pumps dependable performers: *Rigid alignment*—all parts are machined with shoulders and recesses to form metal to metal joints. *Self-priming*—the self-contained pumping unit takes suction from the pit in which it is mounted. *Simple installation*—vertical suspension saves space and cuts installation cost. *Saves piping*—pump element is suspended on a welded steel discharge column with the motor mounted at the top of the column and direct coupled to the driver shaft. Capacities to 7500 gpm and heads as required. Furnished with motor or to fit motor you have.

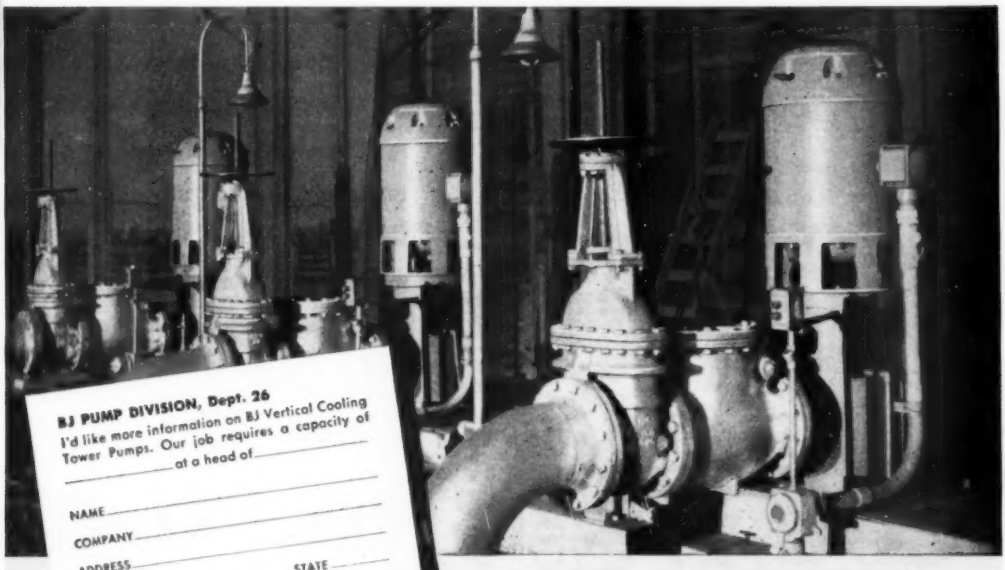
Ask your local BJ representative or send the coupon below for details.

Byron Jackson Co.

Since 1872

P. O. Box 2017 Terminal Annex, Los Angeles 54, Calif.

OFFICES IN PRINCIPAL CITIES



BJ PUMP DIVISION, Dept. 26
I'd like more information on BJ Vertical Cooling Tower Pumps. Our job requires a capacity of _____ at a head of _____

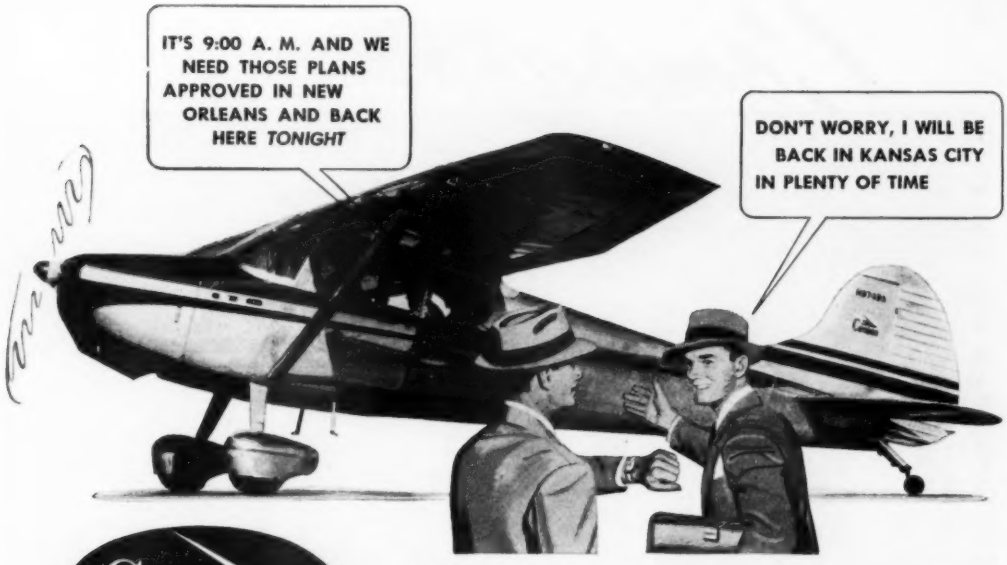
NAME _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____

BJ VERTICAL COOLING TOWER PUMPS INSTALLED AT GULF OIL CORP., GYPSY DIVISION, EUNICE, NEW MEXICO


IT'S 9:00 A. M. AND WE NEED THOSE PLANS APPROVED IN NEW ORLEANS AND BACK HERE *TONIGHT*
DON'T WORRY, I WILL BE BACK IN KANSAS CITY IN PLENTY OF TIME

Cessna 170

America's Lowest priced 4-place, All-Metal Plane... by Several Thousand Dollars

GET ALL THIS IN YOUR NEW AIRPLANE AND ENJOY...

All-Metal Construction. Gives you rugged strength, greater safety, lower maintenance. Guarantees additional usable years.

High Cruising Speed and High Economy. Cruises faster with more miles per gallon than any plane in its class . . . proven by recent efficiency races.

Travels with 4 Adults in Comfort. 4 adjustable, foam rubber seats, ample leg room front and rear gives you solid comfort during long trips.

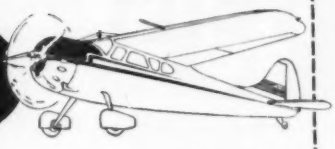
Low Noise Level. Fine new soundproof features let you converse in normal tones during flight. Try it.

Sufficient Pay Load. Take 4 people, luggage and gas for a 500-mile hop—safely, without exceeding legal pay load.

Prop-to-tail Reliability. Practical design, steel construction proven power plant and shock-proof landing gear, quality built throughout.

When you examine the new Cessna 170 you'll see *why it outsold all other 4-place airplanes during 1950,* regardless of price . . . you'll see why this quality, versatile, economical plane was built with *you* in mind.

Cessna 190 SERIES



Designed especially for business use, this big, beautiful plane seats 5 with comfort, cruises at over 160 m. p. h., is easy to fly, economical to use. Airline-type engines and Hamilton Standard Constant Speed Propellers.

Cessna 190 Series on Display at Your Cessna Dealer's

MAIL THIS COUPON NOW!

Cessna Aircraft Co.
Dept. OG-4, Wichita, Kansas

Name _____
Phone _____
Address _____
City _____ State _____
Firm Name _____

Compare-

STURDYBILT with ANY Type of Field Housing

Look What STURDYBILT Gives You!

- **DESIGN**
  That "custom-built" look and expensive house comfort.
- **PORTABILITY**
  Moved to your site . . . erected in days instead of weeks.
- **DEMOUNTABILITY**
  Take houses with you when you move. Practically no loss of material.

MANUFACTURERS OF SPECIAL MILLWORK: DISTRIBUTORS OF JOHNS-MANVILLE BUILDING MATERIALS; CURTIS WOODWORK.

When you need field housing you need it quickly. You also want low cost housing that is attractive to workers' families and comfortable for year 'round living.

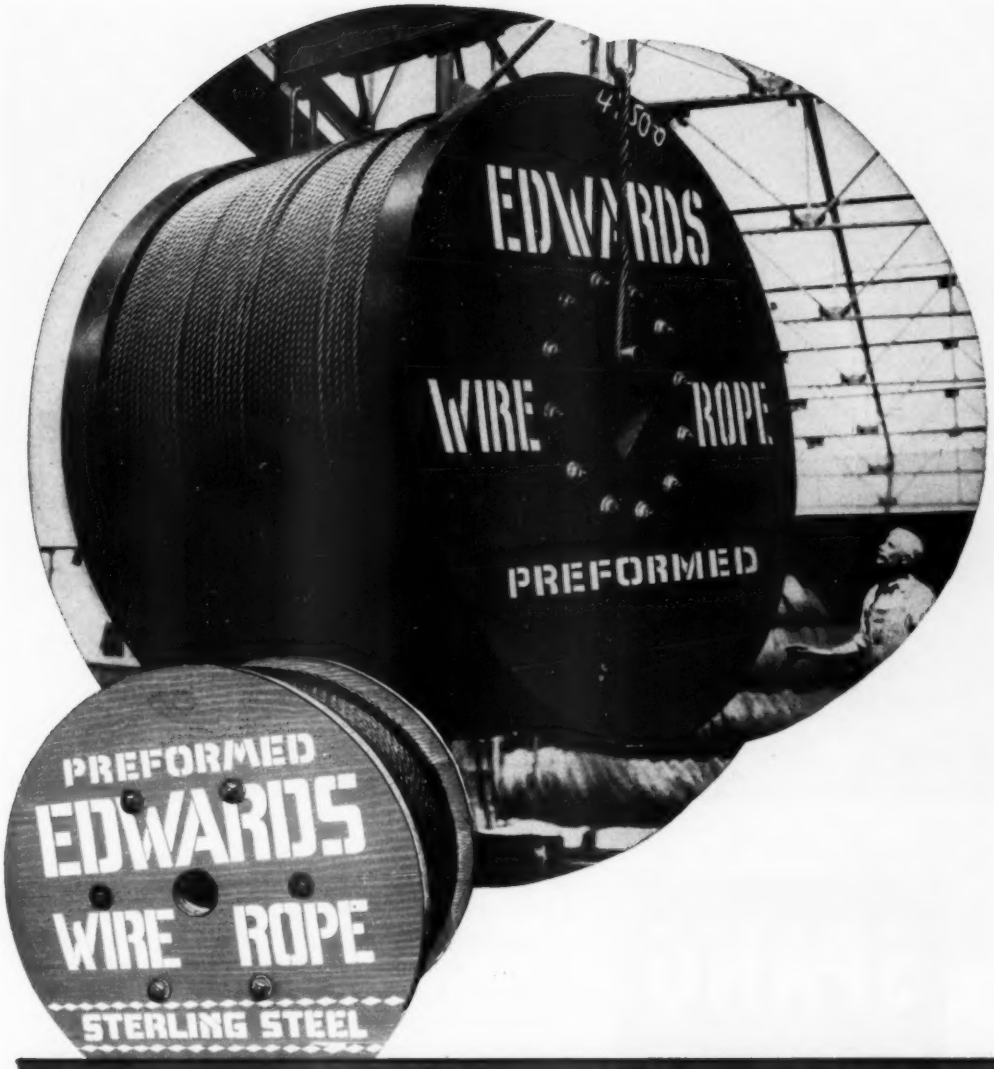
STURDYBILT gives you these features *plus* portability.

When you buy oil field housing compare any other type of housing with the STURDYBILT plan. You'll find you can't beat STURDYBILT for speed of erection . . . durability . . . portability . . . attractiveness or comfort.

STURDYBILT PREFABRICATED, DEMOUNTABLE HOUSES

SOUTHERN MILL & MANUFACTURING CO. • TULSA, OKLAHOMA

STURDYBILT HOUSES COMPLY WITH COMMERCIAL STANDARD CS125 OF THE NATIONAL BUREAU OF STANDARDS FOR PREFABRICATED HOMES



YOU CAN BET YOUR LIFE ON

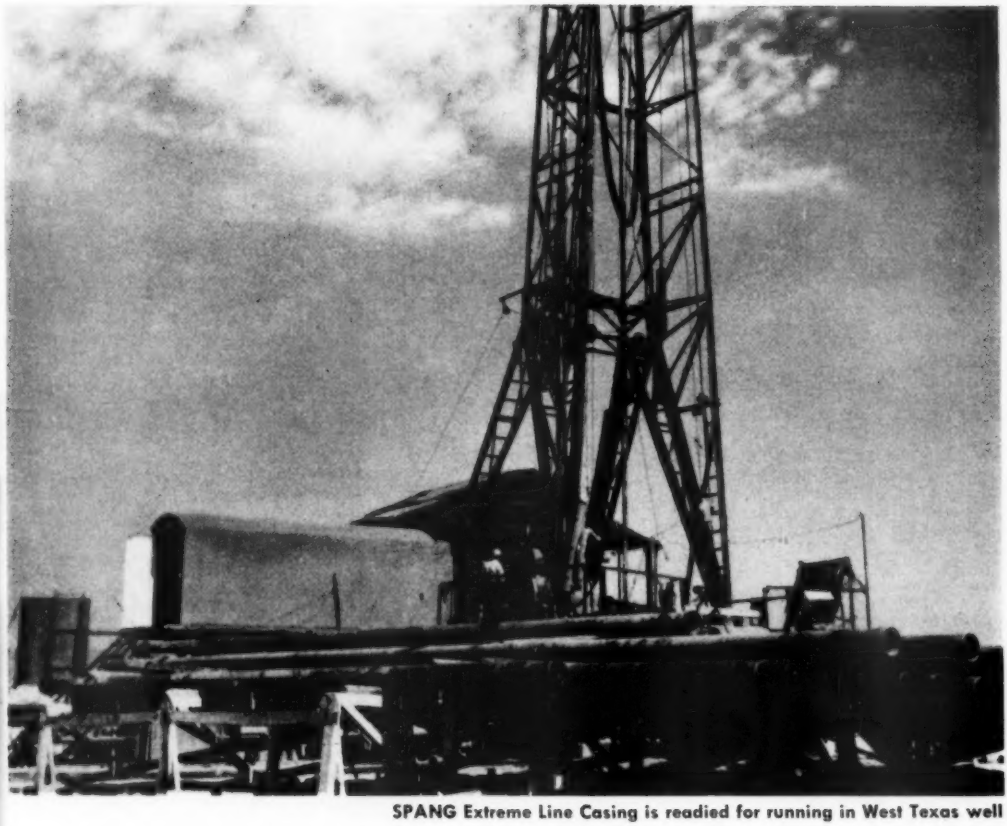
EDWARDS
WIRE ROPE

Head Office: SAN FRANCISCO • Main Plant: SOUTH SAN FRANCISCO

Branch offices

SEATTLE • PORTLAND • LOS ANGELES • HOUSTON

Distributors throughout the West, Gulf Coast and Mid Continent



SPANG Extreme Line Casing is readied for running in West Texas well

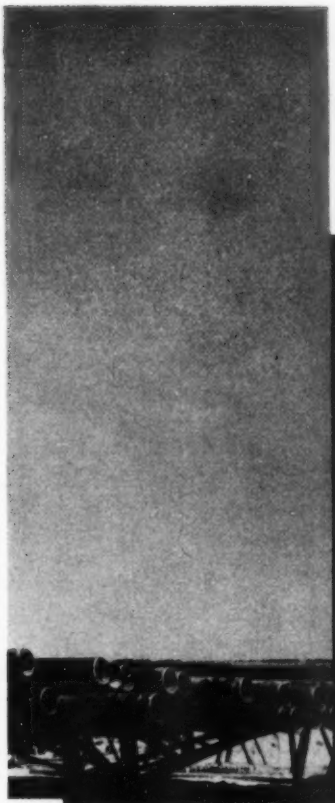
SPANG Extreme Line Casing

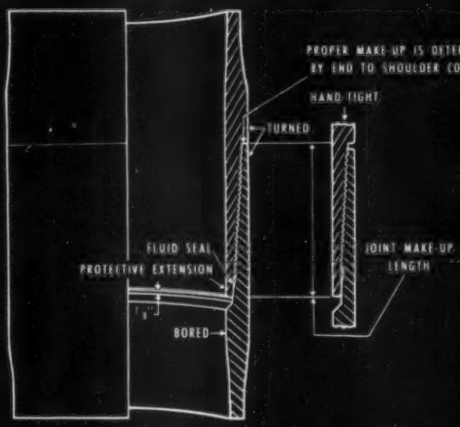
FAST MAKE-UP—Modified Acme-type threads on Spang Extreme Line Casing guide the male into quick engagement with the female; cross threading is practically impossible. Proper make-up is automatically determined by end-to-shoulder contact. The number of threaded connections in a string is cut 50% by elimination of separate couplings.

POSITIVE FLUID SEALING—Fluid seal in Spang Extreme Line Casing is independent of joint threads, which act only as mechanical interlocks. The metal-to-metal seal is accomplished by seating a curved surface in a tapered conical seat, assuring a positive, leak-proof connection.

DESIGNED FOR DEEP DRILLING—Spang Extreme Line Casing has exceptionally rugged joints, streamlined external and internal surfaces, and inherent strength to resist the conditions encountered in deep well drilling.

NATIONAL OIL FIELD MACHINERY AND EQUIPMENT ★ SPANG STEEL PIPE ★





Spang Extreme Line Casing has a minimum OD joint, provides maximum running speeds and eliminates separate couplings, while retaining maximum joint strength.

Spang Extreme Line Casing's streamlined exterior avoids hanging-up while running, and the smooth interior allows tools to pass readily.

Spang Extreme Line Casing is engineered for dependable performance in the particularly rugged demands existing in deep well drilling.

Eight reasons why it pays to use Spang Extreme Line Casing are detailed in Bulletin 352. Write for your copy, or check for details at your National Supply Store.

THE NATIONAL SUPPLY COMPANY

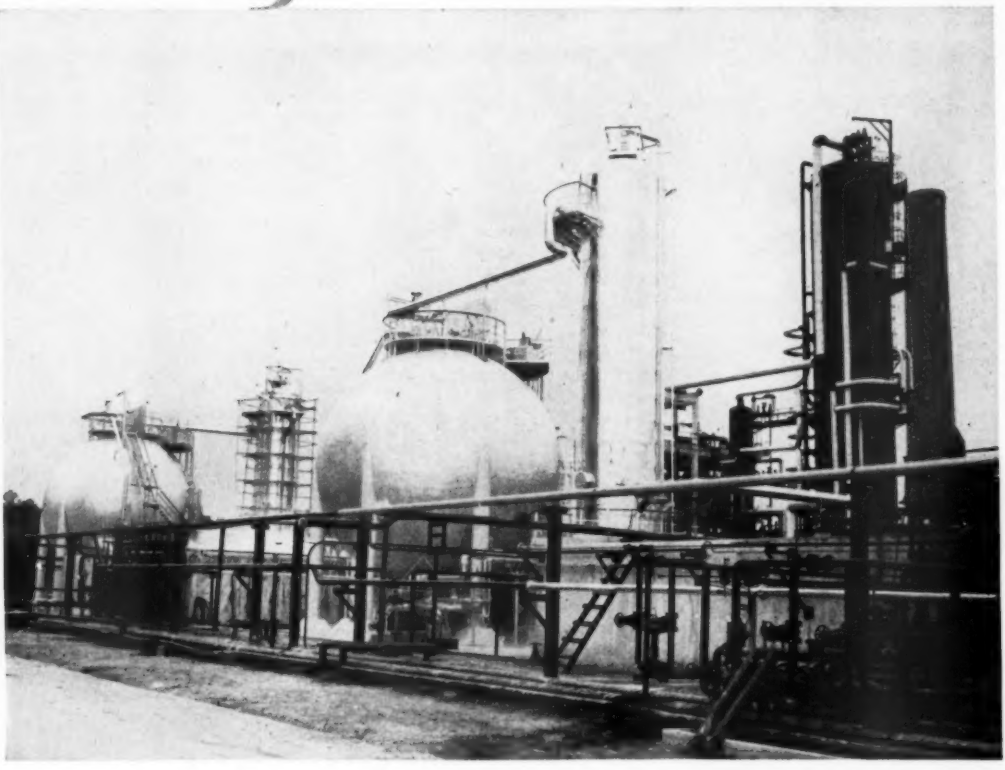
Spang-Chalfant Division—General Sales Offices: Pittsburgh, Pa.

Division Tubular Offices:

DENVER, COLORADO • HOUSTON, TEXAS • FORT WORTH, TEXAS • LOS ANGELES, CALIFORNIA
PITTSBURGH, PENNSYLVANIA • TULSA, OKLAHOMA • CALGARY, ALBERTA, CANADA

NATIONAL BLUE PRODUCTS

CITIES SERVICE } another leading refiner desalts with PETRECO



Cities Service has long been recognized for progressive leadership, dependable excellence of product and refining know-how. The first Petreco Desalter for Cities Service was installed in their East Chicago, Indiana, refinery. When their great new refinery at Lake Charles, Louisiana, was built, Petreco Desalters were installed as part of the regular refining flow system.

There is only one way to earn a *repeat* installation for a company such as Cities Service, and that is to produce results the first time. In this particular case the Petreco Electrosphere to the right in the picture above has delivered throughputs as high as 75,000 barrels per day for extended periods of time and was a considerable factor in the topping units continuous fifteen months run during which 30,000,000 barrels of oil were processed. Results such as these are the reasons why leading refiners continue to specify Petreco Desalting and Petreco Service.

PETRECO PROVIDES COMPLETE DESALTING SERVICE AND FACILITIES

PETRECO

SPECIALIZED *Electric* PETROLEUM PROCESSES { DESALTING / DEHYDRATING

PETROLEUM RECTIFYING COMPANY

5121 SO. WAYSIDE DRIVE, HOUSTON 3, TEXAS
1390 E. BURNETT ST., LONG BEACH 6, CALIFORNIA

PR 51-3

LEFT: Catalyst Lift Air blower in foreground supplies air at 13,320 cfm, 4.25 psig to raise regenerated catalyst to reactor. Kiln Combustion Air blower is seen at the right.

BELOW: Carbon is burned off the catalyst while air is supplied at 34,400 cfm, 3.5 psig by this Kiln Combustion Air centrifugal blower.

ALLIS-CHALMERS Centrifugal Blowers

Help New Cracking Methods

As CRACKING METHODS IMPROVE, more centrifugal blowers are being employed. The Allis-Chalmers single stage blowers seen here are essential to the three new Thermofor Catalytic Cracking units installed by the Magnolia Petroleum Co. at Beaumont, Texas.

Placed "on stream" last Fall, a total of six turbine-driven A-C blowers provide Kiln Combustion and Catalyst Lift Air in the Blower Room of the new catalytic structure.

The high efficiency impellers are of special totally enclosed, backward flow design. This covered design makes the impellers independent of tolerance variations; the backward flow design gives good pressure, volume and horsepower characteristics.

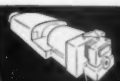
High strength and long life is assured by all welded, alloy steel impeller construction and pressure lubricated sleeve and thrust bearings. Cast iron casing increases rigidity and decreases noise level.

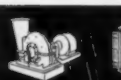
For this kind of specialized design . . . or for standard high quality, thoroughly tested air and gas handling equipment . . . call your nearest A-C office or write direct to Allis-Chalmers, Milwaukee 1, Wisconsin. A-3447

ALLIS-CHALMERS

Texrope is an Allis-Chalmers trademark.

Power, Electrical, Processing Equipment for Petroleum Industry


TURBINE-GENERATORS


BLOWERS and COMPRESSORS

TRANSFORMERS

UNIT SUBSTATIONS

MOTORS—TEXROPE DRIVES-CONTROL

CENTRIFUGAL PUMPS

Here's

what the drill string feels like* when you use AQUAGEL

*That's literally true. Look at it this way. When the mud builds a thick filter cake—it's like driving a car with the brakes on. Everything on the rig has to work harder . . . drill string, rotary, slush pumps, drawworks *and crews!*

Aquagel makes it a different story. Aquagel takes the "brakes" off the drill string by building a thin, slick, flexible filter cake that doesn't interfere with drill string or tools. Because this thin, slick filter cake is relatively impermeable, water loss is kept low—hole trouble is kept down and fishing minimized. Aquagel muds have excellent lubricating qualities, reducing wear on all parts of the mud system and easing the load on the pumps.

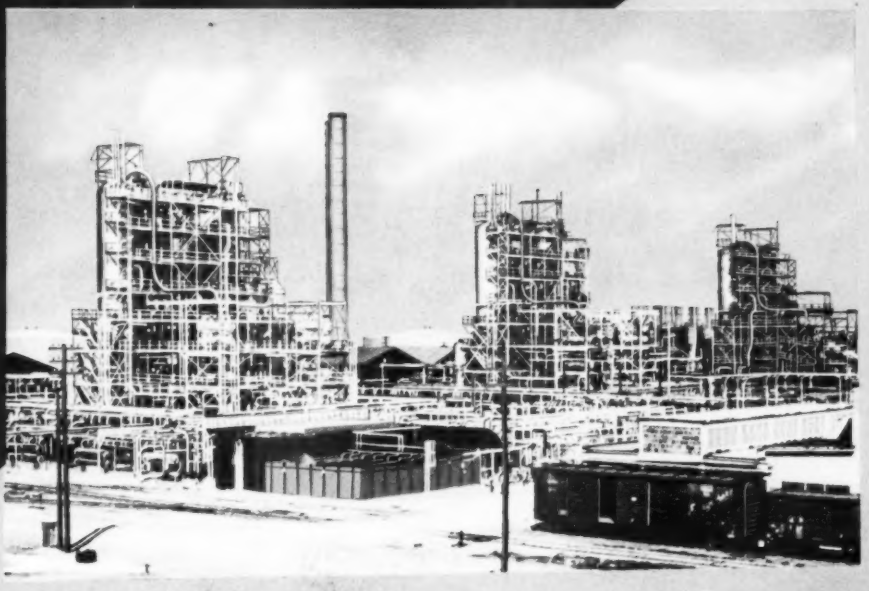
Aquagel provides other advantages—consolidation of loose formations; reduced caving-hole hazard; prevention of mild circulation losses; safer drilling through shales; excellent suspending qualities to hold and remove cuttings.

These are the reasons why experienced operators have used Aquagel for 24 years—to get faster, easier, safer drilling with the "Best of *ALL* the Bentonites."

Baroid
BAROID SALES DIVISION
NATIONAL LEAD COMPANY
LOS ANGELES 12 · TULSA 3 · HOUSTON 2

COMPLETE DRILLING MUD SERVICE

225,000 bbls/day

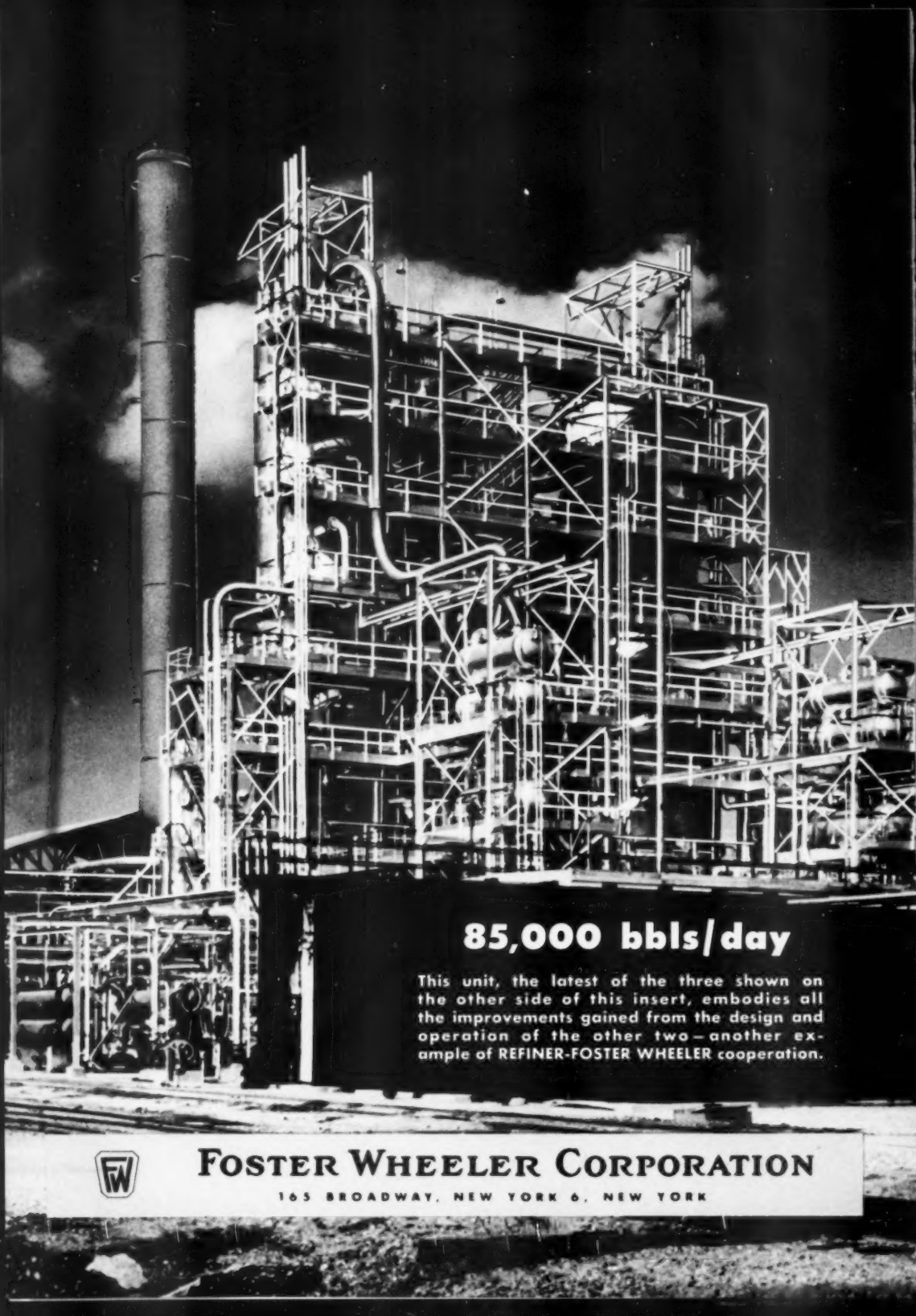


These three crude distillation units, in operation in a Gulf Coast refinery with a combined capacity of 225,000 barrels per day were . . . . . .

designed
and
constructed
by

FOSTER WHEELER

165 BROADWAY NEW YORK 6 NEW YORK


85,000 bbls/day
This unit, the latest of the three shown on the other side of this insert, embodies all the improvements gained from the design and operation of the other two – another example of REFINER-FOSTER WHEELER cooperation.
FOSTER WHEELER CORPORATION
165 BROADWAY, NEW YORK 6, NEW YORK

YEARS MORE LOW-COST LIFE

with

ELECTRUNITE HEAT EXCHANGER TUBES

Increase the years between retubings . . . cut the per-hour cost of exchanger operation . . . specify ELECTRUNITE Pressure Tubes for new equipment . . . and for all your retubing jobs.

Fully-normalized structure provides uniform ductility for fast, smooth roll-in of ELECTRUNITE Tubes. Cold forming gives them clean, scale-free surfaces that assure maximum service life. Choose from a wide range of sizes and grades, in carbon steel and stainless steel analyses. For complete data and information, write to

REPUBLIC STEEL CORPORATION
STEEL AND TUBES DIVISION
224 EAST 131st STREET • CLEVELAND 8, OHIO

REPUBLIC STEEL

Republic

ELECTRUNITE

BOILER, CONDENSER AND HEAT EXCHANGER TUBES

FEW moving parts

means LOW MAINTENANCE

means ECONOMICAL OPERATION

means FULL DEPENDABILITY

FULLER ROTARY COMPRESSORS

Five two-stage natural gas boosters, each handling 1,770,000 SCFD, boosting from 10-lb. gage to 120-lb. gage, at speed of 800 r.p.m., driven by Climax engines.

Fuller Rotary Compressors are engineered and built to insure a fully dependable source of power in the overall picture of your operations. They are the economical choice for general plant air, purging gas, refrigeration in alkalization units, and for handling natural, manufactured, and various refinery gases. In booster operations, whether for field boosting or to trunk line levels, you'll find Fullers doing a better job. Moving parts have been kept to a minimum—rotor, bearings, blades—require little attention.

There are no valves to leak, no seats to grind. Blades automatically compensate for wear. Force-feed lubrication to all parts within the cylinder insures constant protection, with minimum wear.

Oil men have put Fullers on their payroll. They've found them to be completely reliable, under all conditions of service—and they've found them to be as economical to operate as they are dependable.

Why not investigate this modern, efficient compressor the next time you are in the market? Write for literature illustrating and describing these machines.

Fuller

PIONEERS OF HIGH-EFFICIENCY ROTARY COMPRESSORS

FULLER COMPANY, Catasauqua, Pa.
120 So. LaSalle St., Chicago 3
420 Chancery Bldg., San Francisco 4

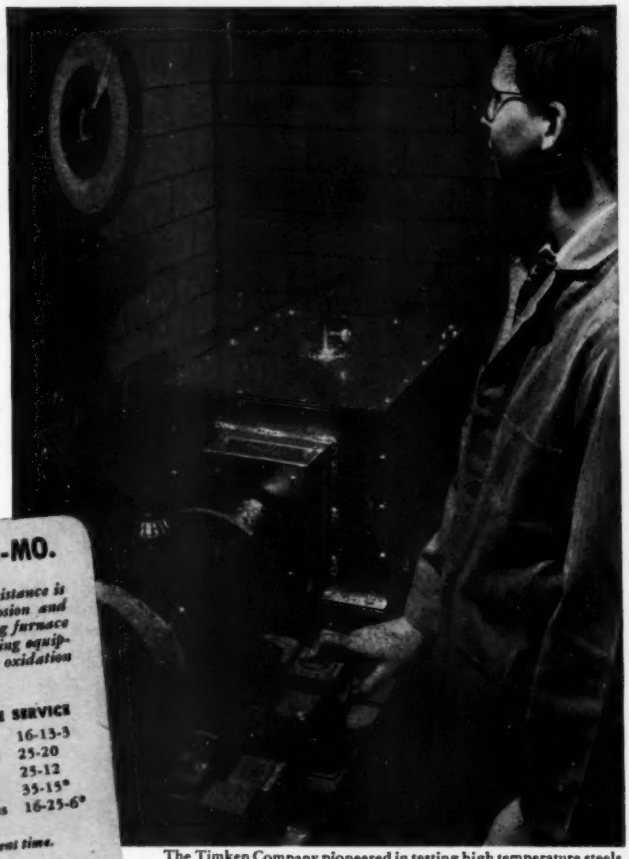
C-220

How to get the most from your high temperature tubes: Ask the experts!

CHANCES are you can find several high temperature steels that will solve your heat, pressure, corrosion and oxidation problems. But there's only *one* steel that will give you maximum tube life per dollar —the best life/cost ratio.

The Timken Company metallurgists—the recognized authorities on high temperature steels—can help you find that one steel. With a background of 20 years of steel development and with 23 different analyses at their disposal—plus wide field experience—they are qualified to help you choose the correct analysis for your application. And whatever analysis is recommended, you can be sure of uniform quality because the Timken Company carefully controls quality from melt shop through final inspection.

Our "RSQ"—Research, Supply, Quality —can solve your tube problems. *Ask the experts!* The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".



The Timken Company pioneered in testing high temperature steels. Hot twist apparatus shown here is used to evaluate the hot working characteristics of high temperature steels.

This month's report is on: **4-6% CR.-MO.**

Suggested for applications where high creep resistance is not required, but where good stability, corrosion and oxidation resistance are essential. For cracking furnace tubes, heat exchangers, super-heaters, air heating equipment and forgings and other parts exposed to oxidation or oil corrosion.

23 TIMKEN STEELS FOR HIGH TEMPERATURE SERVICE

Carbon	Sicromo 2	Sicromo 5S	16-13-3
Carbon-Mo.	Sicromo 2½	Sicromo 5MS	25-20
DM-2	2¼% Cr.-1% Mo.	Sicromo 7	25-12
Silmo	Sicromo 3	Sicromo 9M	35-15*
DM	4-6% Cr.-Mo.	18-8 Stainless	16-25-6*
2% Cr.-Mo.	4-6% Cr.-Mo.-Ti.	18-8 Cb	

*Not available as seamless tubing at the present time.

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

Specialists in alloy steel—including hot rolled and cold finished alloy steel bars—a complete range of stainless, graphitic and standard tool analyses—and alloy and stainless seamless steel tubing

Which do YOU need to protect YOUR business from FIRE?

Kidde Multi-Jet Nozzle. The "business end" of a Kidde CO_2 fire extinguishing system. It blankets flame with fire-smothering carbon dioxide.

Kidde Dry Chemical Wheeled Extinguisher. A "one man fire engine" to control large fires in flammable liquids, live electrical equipment.

Kidde "Heat Detector". 24 hours a day this sensitive detector stands guard ready to set off a Kidde CO_2 system automatically if fire should strike.

Kidde Carbon Dioxide Portable. Fast-acting...easy to use. A pull of the trigger releases a rolling fog of CO_2 gas that smothers flame instantly.

Kidde Smoke Detector. A new development in industrial fire fighting. Detects hidden smoldering fire, tells in which room or vault it is located.

Kidde CO_2 Hose Reel Equipment. Combines the convenience of a portable fire extinguisher with the great fire-killing power of a built-in system.

Kidde Trailer. An economical, fast-acting unit for thorough-going fire protection in smaller plants and airports and auxiliary protection in larger ones.

Kidde Chemical Extinguishers. Foam, Soda-acid or water portable extinguishers in stainless steel. Two-and-a-half gallon capacity. Easy to use, reliable, economical.

Kidde Vaporizing Liquid Extinguisher. Approved for fires in flammable liquids and electrical equipment. Discharges carbon tetrachloride.

For many years Walter Kidde & Company, Inc. has specialized in fire extinguishing equipment. It ranges from 2½ pound portables to huge built-in systems. Need advice on protection for your plant? Call or write Kidde.

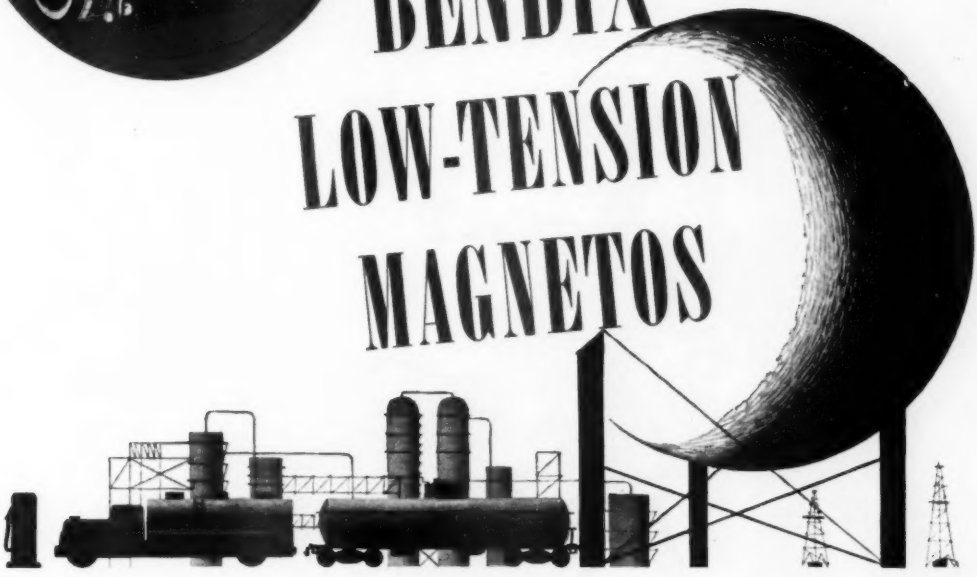
Kidde

Walter Kidde & Company, Inc., 1154 Main Street, Belleville 9, N. J.

Walter Kidde & Company of Canada, Ltd., Montreal, P. Q.

Designed for the Petroleum Industry—

BENDIX LOW-TENSION MAGNETOS



It's the magneto designed to eliminate fire hazard, foremost problem of the petroleum industry. The special ventilating arrangement of the Bendix Low-Tension Magneto permits air laden with explosive fumes to enter the magneto for ventilation without danger of igniting the surrounding air. Kits are also available to convert magnetos now in use to the "flame-proof" ventilation type.

In addition to this important safety feature, Bendix Low-Tension Magnetos actually reduce engine maintenance and operating costs. For example, spark plug erosion is reduced to a minimum. The distribution of low-tension voltage to the high-tension coils is through a series of breaker assemblies, thus eliminating trouble often experienced with the conventional distributor. Variable or fixed sparks can be obtained by internal adjustment.

For safety and low operating costs it will pay you to specify Bendix Low-Tension for all your magneto requirements. Complete data available on request.

- **Low Plug Erosion Rate**
- **Breaker Type Distributor**
- **Ventilation without Fire Hazard**
- **Radio Shielding Available**
- **Variable or Fixed Ignition**

Bendix

Export Sales: Bendix International Division, 72 Fifth Avenue, New York 11, New York

Bendix AVIATION CORPORATION

FACTORY BRANCH OFFICES:
117 E. Providencia Avenue, Burbank, California • Stephenson Building, 6560 Cass Avenue, Detroit 2, Michigan
Brouwer Building, 176 W. Wisconsin Avenue, Milwaukee, Wisconsin • 582 Market Street, San Francisco 4, California

Let's go...let's get that SCRAP in!

All your SCRAP is urgently needed, NOW

THE scrap shortage is serious. *Your* scrap—every pound of iron and steel scrap you can locate in your plant or factory—is vitally needed and needed right away. For unless you do everything possible to get this scrap on its way to the mills, steel production is bound to slow up. That can't be allowed to happen. But without your help it surely will.

It takes at least one-half ton of scrap to make one ton of steel. With the mills turning out more than 2 million tons of steel per week, over 1400 carloads of industrial scrap are needed *every day*. And industry, somehow, must provide it.

What you can do to meet this emergency

First, organize a permanent Scrap Salvage Committee and make the "drive-for-scrap" part of your daily operations. Search out every possible source of scrap. Turn your old and worn-out equipment, tools and machinery over to your scrap dealer, at once. Dig out your discarded dies, rusted-out tanks and boilers, your old rails and other miscellaneous junk, and start them back to the mills through your scrap dealer. Encourage every employee to report every retired or obsolete machine that now stands idle—see that it is turned in for scrap.

By getting this "dormant" scrap off your premises and into the furnaces you'll be helping not only yourself but America as well. *More* scrap turned in, means *more* steel turned out—it's as simple as that. So let's get going.

You'll find your local scrap dealers listed in the yellow pages of the phone directory.

USS

1-1329

This page would ordinarily be used to tell you about

NATIONAL SEAMLESS

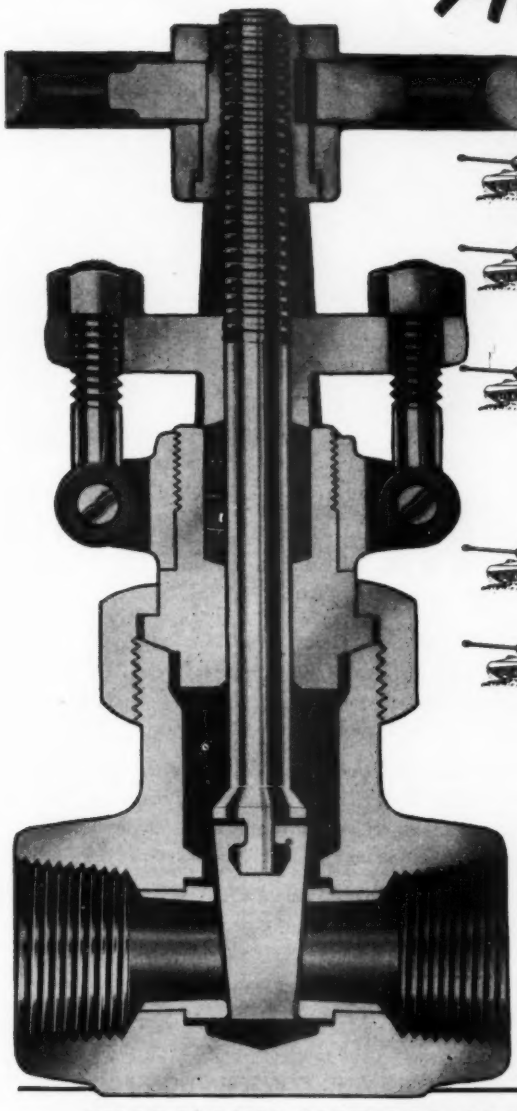
Drill Pipe, Casing and Tubing

but, because without SCRAP we cannot produce steel, we are asking instead for your all-out help in getting more SCRAP to the mills.

NATIONAL TUBE COMPANY, PITTSBURGH, PA.
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

UNITED STATES STEEL

All 5 Vital Points are ARMORED



Body and Yoke are of Forged Steel, for extra strength and longer life.

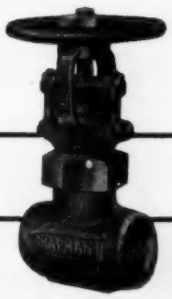
Bolted Follower
with no follower threads on yoke to corrode. Follower easily tightened down any time when necessary.

Malcomized Gate Faces:
When furnished with either 12-14% or 18-8% stainless steel trim, List 960's gates are hardened by "Malcomizing," patented Chapman process. "Malcomizing" hardens to a minimum of 800 Brinnell, which minimizes seizing or galling and lengthens valve life.

Super-Hardened Seat Rings
and wedge-faces of stainless steel help to save on repairs and replacements.

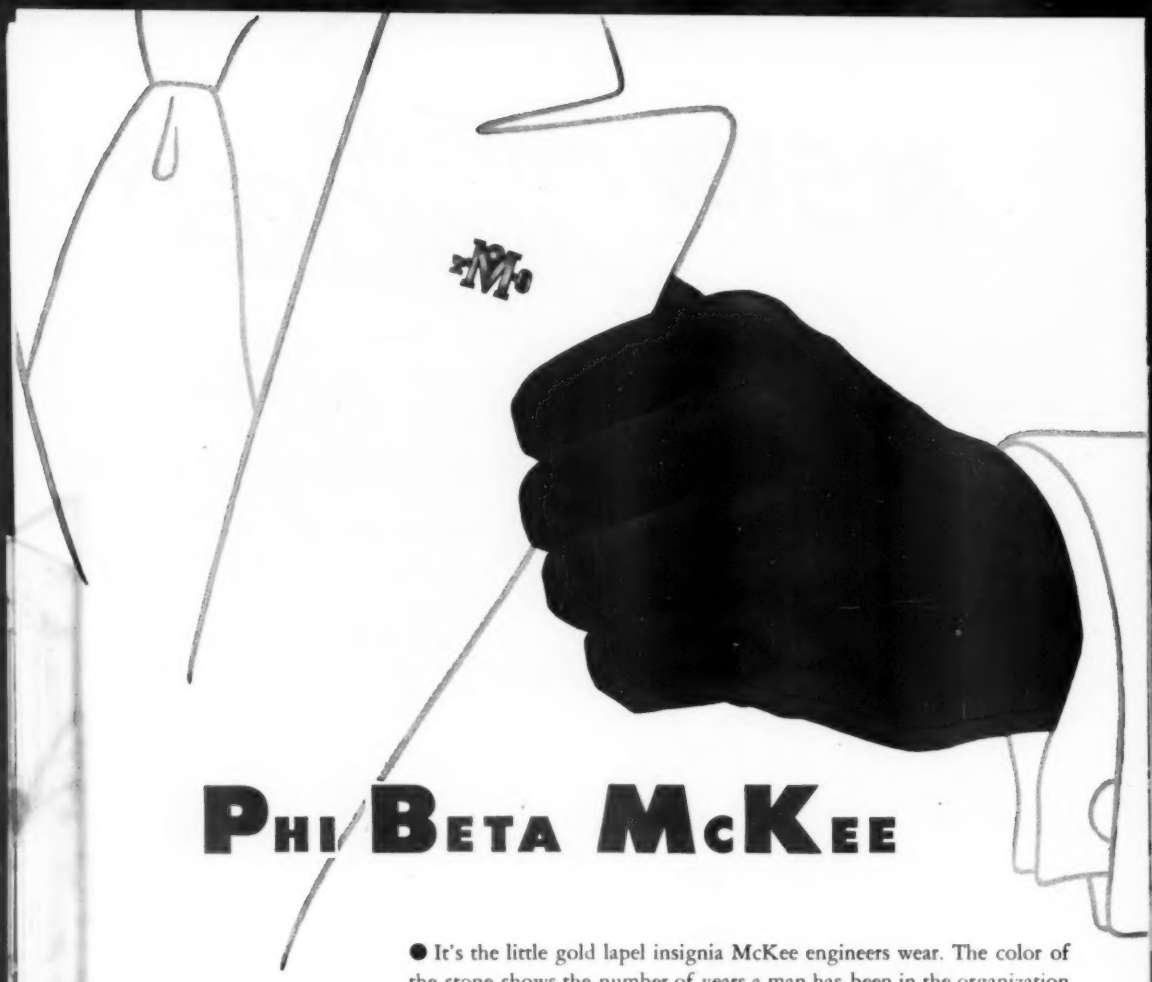
Strong Stem and Wedge Connection
Extra strength of stem-and-wedge gate connection provides protection against even unusual service stress.

Chapman List 960 is available in sizes from ¼" to 2" . . . in four different alloy-combinations of body and trim which qualify this rugged forged gate valve for many different services. Gasketed joint, or metal-to-metal. Rising stem with yoke (shown) or rising stem inside screw. Pressure range: 2000 lb. at 100°F.—380 lb. at 1000°F. (for higher pressures, specify List 990). Write for illustrated fact-sheet on List 960.



CHAPMAN'S LIST 960 FORGED Gate Valve

The Chapman Valve Manufacturing Company
INDIAN ORCHARD, MASSACHUSETTS



PHI BETA McKEE

● It's the little gold lapel insignia McKee engineers wear. The color of the stone shows the number of years a man has been in the organization and a good many of them show twenty-five years and more.

Sure, we do a little kidding about them—call 'em our "Phi Beta McKee's" —but we wear them with pride. That's because they really mean years of ***experience,*** and in this highly specialized business of designing and building steel plants and petroleum refineries, experience pays off.

The design, engineering and construction of a modern refinery or steel plant is a complex undertaking requiring the coordinated effort of many kinds of technical specialists and skilled craftsmen. Here at McKee we have it down to a smooth-working system because so many of us have been working together at it for so many years.

DESIGN, ENGINEERING AND CONSTRUCTION FOR THE PETROLEUM REFINING AND IRON AND STEEL INDUSTRIES

McKee Engineering

Arthur G. McKee & Company • Established 1905

Headquarters: McKee Building, 2300 Chester Avenue, Cleveland 1, Ohio. ***New York:*** 30 Rockefeller Plaza, New York 20, N. Y. ***Tulsa:*** 2803 West 40th Street, Tulsa 7, Oklahoma. ***England:*** The Iron and Steel Division of Arthur G. McKee & Company, is represented by Head, Wrightson & Co., Ltd.

KOPPERS piston rings save time, labor and money

in all kinds of equipment

Railroads, trucks, buses, airplanes, cars, pumps . . . in every conceivable use of piston rings . . . Koppers provides *better* oil control, *more* power, *less* wear, *longer* life for expensive equipment!

Koppers K-Spun Piston Rings, produced by centrifugal casting process, are *100% stronger . . . four times more resistant to combustion shock than ordinary rings! They will not break in installation or for the life of the engine.*

Koppers Porous Chrome* Rings have a porous chrome surface that holds and distributes oil during break-in, quickly wears down to perfectly seated solid chrome that prevents grit and other particles from embedding in the ring surface where they can scratch cylinder walls. Porous Chrome Rings last up to four times as long as other rings, reduce cylinder wear 50% or more. That's why hundreds of companies are reporting amazing savings in equipment and maintenance costs through the use of Koppers Rings. Remember . . . we make rings for any equipment that uses piston rings.

*VAN DER HORST PROCESS

If you have a piston ring problem, why not get the *right* answer from us! Write, wire or phone Koppers Co., Inc., Piston Ring Dept., 1651 Hamburg St., Baltimore 3, Md.

KOPPERS

KOPPERS

AMERICAN HAMMERED

PISTON RINGS

SPECIFY: Fast's Couplings . . . Koppers Piston Rings . . . both famous products of the Koppers Co., Inc.

ONLY KOPPERS CAN FURNISH K-SPUN OR POROUS CHROME!

Oil Field "Natural"

for Haulability and Versatility

A natural for the oil fields! That's the new Baker 9-X "No Push Beam" Bulldozer. Just load it on a regular highway-width trailer and ramble—no permits needed day or night—for it's only 96" wide—legal anywhere. But it digs *BIG* because it is BIG-MOUNTED on the versatile Allis-Chalmers HD-9 Tractor—with 8 inches extra moldboard height to permit full loads.

Get the story of this revolutionary design in Bulldozers, developed and proved in cooperation with A-C engineers, from your Baker, Allis-Chalmers dealer, or write direct for Engineering Bulletin 896-B. THE BAKER MANUFACTURING COMPANY, Springfield, Illinois.

P. S. Baker is the pioneer and the *specialist* in bulldozers.

Performance? Here's What — and Why!

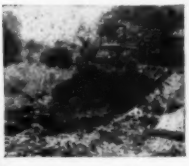
In and Out *FAST*—Simple, direct mounted design (see above) provides steeper angle of approach for "yard-saving" performance. Drops 13", raises 37".

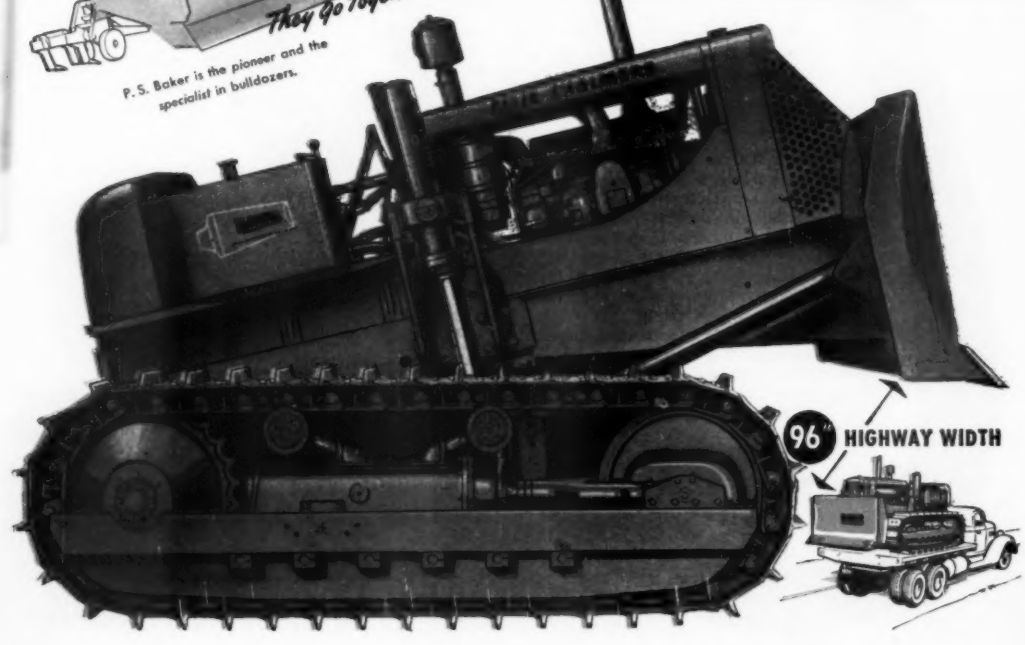
Slush Pit "Natural"—9-X dug this 6 ft. deep, 50 ft. long slush pit in 80 minutes—81 passes. 11 foot approach down grade; up only 8 feet!

Versatile, Too!

9-X can be hauled even at night—the perfect "job jumper." Pushes big loads for rooting a roadway (left, below).

"Pushover" for clearing—Gets down for rooting, sure-footed with good leverage for dozing trees and walls.





PATTERSON-BALLAGH PATTERSON-BALLAGH PATTERSON-BALLAGH PATTERSON-BALLAGH

A new PB Service...

Fastest, easiest and simplest protector installation!

Field-proven rubber holds up under tough drilling conditions, deep drilling temperatures!

Relieved end design gives extra shock and tear resistance where it's needed most!

PB's own men provide a fully responsible field service.

PB PROTECTORS

CAN BE EASILY REMOVED FROM PIPE ON YOUR RACK

FOR RE-USE!

PB offers this specially engineered protector removal and re-installation service in all major domestic oil fields. For full information on this new money-saving service, call...

P B

PB SERVICE BRANCHES

OIL FIELD SPECIALTIES

Patterson-Ballagh

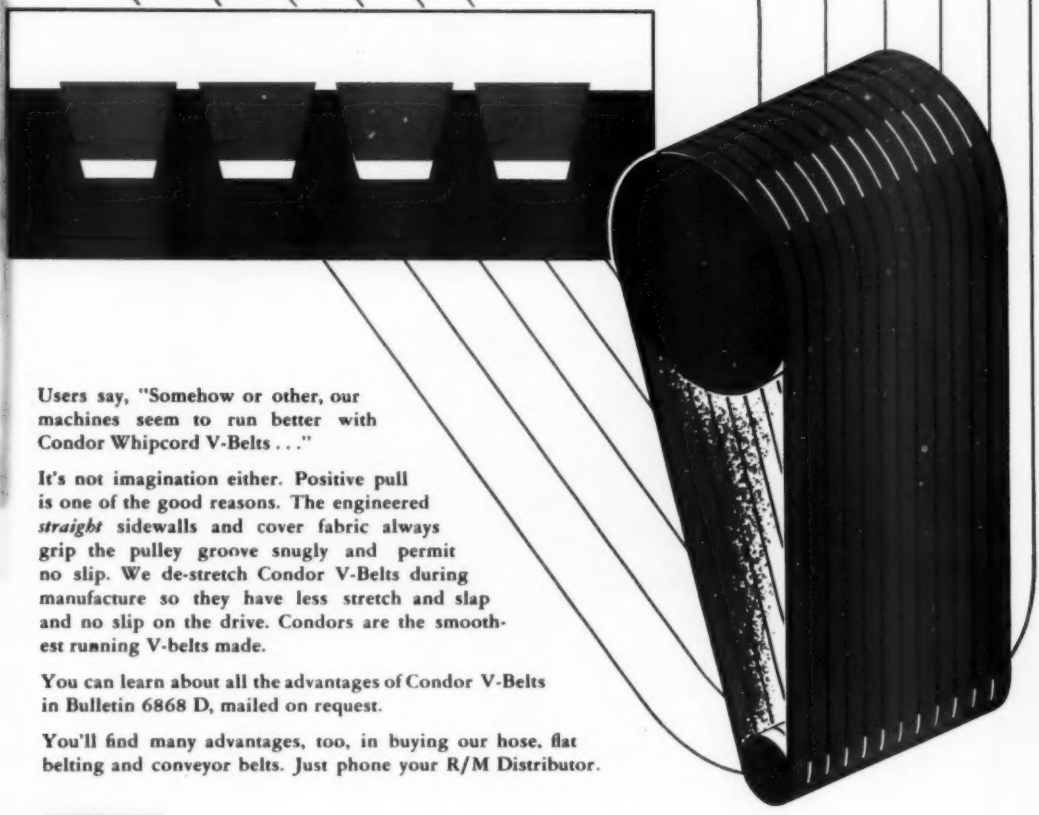
Division of Byron Jackson Co.

MAIN OFFICE: 1900 EAST 65TH STREET

LOS ANGELES 1, CALIFORNIA

PATTERSON-BALLAGH PATTERSON-BALLAGH PATTERSON-BALLAGH PATTERSON-BALLAGH

Condor V-BELTS GRIP THE GROOVES



Users say, "Somehow or other, our machines seem to run better with Condor Whipcord V-Belts . . ."

It's not imagination either. Positive pull is one of the good reasons. The engineered *straight* sidewalls and cover fabric always grip the pulley groove snugly and permit no slip. We de-stretch Condor V-Belts during manufacture so they have less stretch and slap and no slip on the drive. Condors are the smoothest running V-belts made.

You can learn about all the advantages of Condor V-Belts in Bulletin 6868 D, mailed on request.

You'll find many advantages, too, in buying our hose, flat belting and conveyor belts. Just phone your R/M Distributor.

MANHATTAN RUBBER DIVISION — PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.

Manufacturers of Mechanical Rubber Products • Rubber Covered Equipment • Radiator Hose • Fan Belts • Brake Linings • Brake Blocks • Clutch Facings • Packings • Asbestos Textiles • Powdered Metal Products • Abrasive & Diamond Wheels • Bowling Balls

BE SURE OF UNIFORM
HIGH QUALITY – SPECIFY

GLOBE
STEEL TUBES

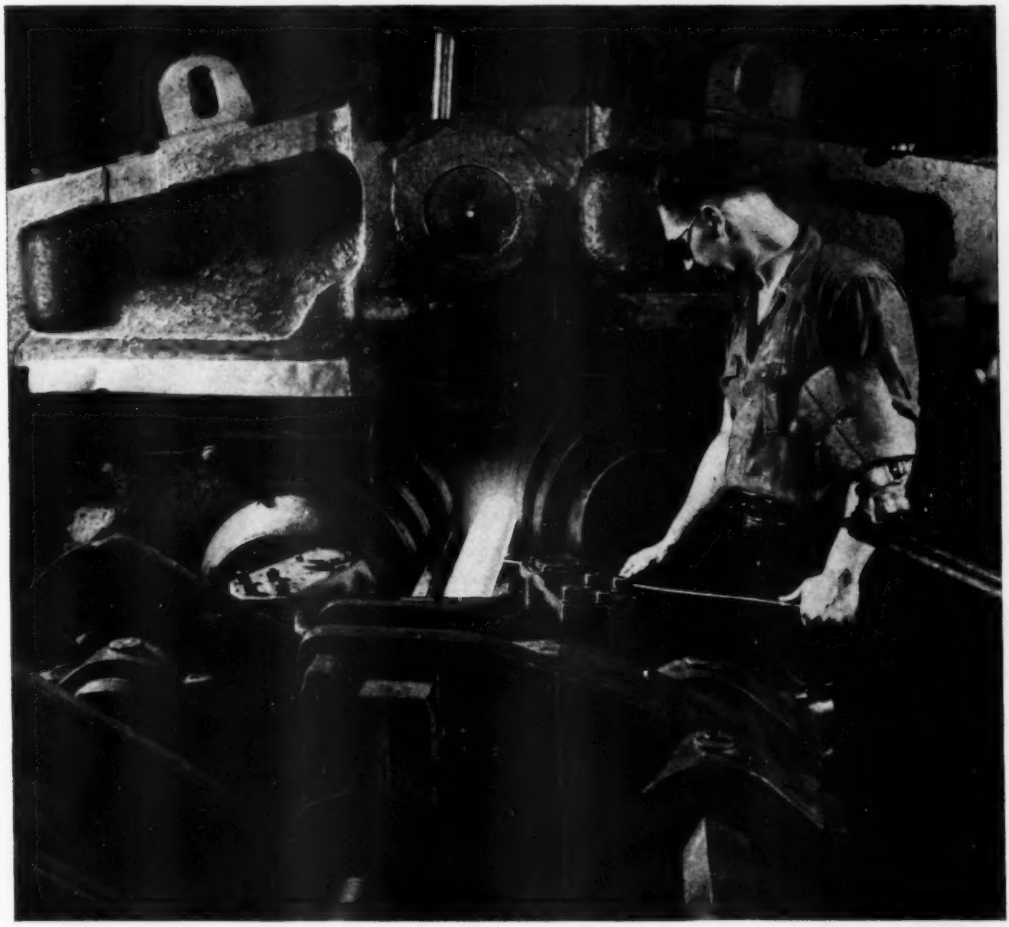
...PRODUCT OF A LEADING
AND SPECIALIZED PRODUCER

From the massive mill that pierces the white-hot billet, through every step in processing, to final checks and tests in the laboratory, Globe processes are *specialized* . . . specialized to give you high quality — uniformity of diameter, concentricity, wall thickness.

Globe has *specialized* in the research, engineering, and manufacture of steel tubes for more than 30 years. Advanced machinery and methods — rigid inspection and quality controls — characterize all production operations from billet to finished tube. Write for the Globe general catalog.

GLOBE STEEL TUBES CO., Milwaukee 46, Wisconsin
Chicago • Cleveland • Detroit • New York • Houston • St. Louis
Denver • San Francisco • Glendale, Cal. • Philadelphia

Producers of Globe seamless stainless steel tubes — Gloweld welded stainless steel tubes — alloy — carbon — seamless steel tubes — Globe-iron seamless high purity ingot iron tubes — Globe Welding Fittings.



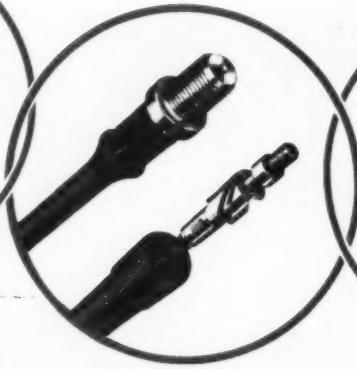
Globe Steel Tubes Are Available In:

- STAINLESS STEELS — GLOBE SEAMLESS
- HIGH PURITY IRON — GLOBEIRON
- STAINLESS STEELS GLOWELD WELDED
- CORROSION RESISTANT STEELS
- ALLOY STEELS
- CARBON STEELS
- HIGH-TEMPERATURE SERVICE STEELS
- STANDARD AND SPECIAL ANALYSIS STEELS
- MECHANICAL AND PRESSURE TUBING

GLOBE TUBES

A GOOD WAY TO PUMP A WELL

AXELSON RODS & PUMPS



CABOT

J&L PIPE

Any sort of pumping equipment, like a late automobile, is likely to give pretty good service. But certain combinations are more desirable than others.

A good way to pump a well is with an AXELSON bottom hole pump, AXELSON rods, J&L tubing, and a CABOT unit powered with a CENTURY motor or a FAIRBANKS-MORSE "ZC" engine.

There is something remarkably smooth and satisfactory about this combination. A well so equipped costs less to operate, and production is more dependable. This is neither hearsay nor advertising license, but a fact.

Ask for further information at your near-by Jones & Laughlin Supply store.

AMERICA NEEDS SCRAP TO MAKE MORE STEEL

"... here's MY warehouse!"

Jones & Laughlin Supply Company

J&L STEEL

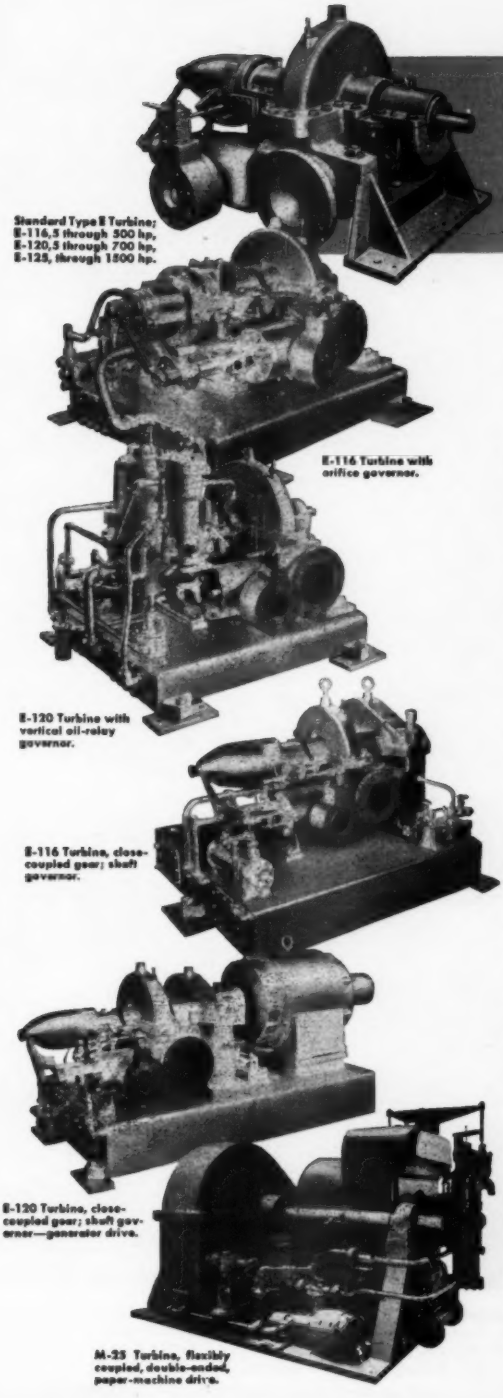
EXPORT: 405 Lexington Ave., New York, N. Y., U. S. A.

82 STORES • 17 OFFICES • 6 RESIDENT SALESMEN

General Offices: TULSA, OKLAHOMA

Subsidiary of Jones & Laughlin Steel Corporation

Take the *Guesswork* out of Turbine Selection!



Standard Type E Turbine; E-116,5 through 500 hp, E-120,5 through 700 hp, E-125, through 1500 hp.

E-116 Turbine with orifice governor.

E-120 Turbine with vertical oil-relay governor.

E-116 Turbine, close-coupled gear; shaft governor.

E-120 Turbine, close-coupled gear; shaft governor—generator drive.

M-25 Turbine, flexibly coupled, double-ended, paper-machine drive.

Westinghouse General-Purpose Turbines can be supplied for mechanical or generator drive . . . either direct connected or geared . . . for condensing or noncondensing operation. This *complete* line . . . plus a nationwide staff of trained steam engineers, conveniently located sales offices, and service shops . . . assures you of the correct solution to *your* steam-drive application problem.

The single-stage Type E turbine, with designs for three basic classes of steam conditions, three wheel sizes and three standard governor types, provides in effect twenty-seven *standard, economical* variations to cover a wide range of applications. In addition, an almost limitless number of special applications can be met through the use of heavy-duty parts, and optional accessories.

Geared-turbine drives are offered either flexibly coupled to accommodate either right- or left-hand gear offsets, double-ended output shafts; or close-coupled (Gearturbines). Gearturbines are standardized on a single offset arrangement, affording utmost economy.

Other types in the complete Westinghouse general-purpose turbine line include heavy-duty and multi-stage units for applications requiring high temperatures and pressures, higher speeds, greater horsepower, extraction for process applications, or higher efficiency than may be had with single-stage machines.

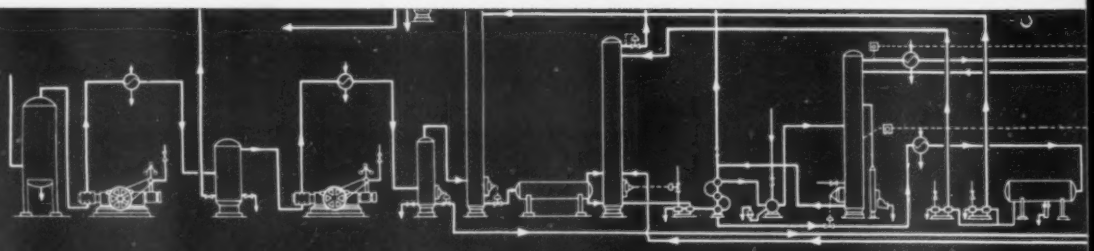
The superiority of the Westinghouse line is the result of over 60-years' design, manufacture, and application experience. To get the benefit of this broad know-how, call your nearby Westinghouse office, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa.

J-50532

YOU CAN BE SURE... IF IT'S

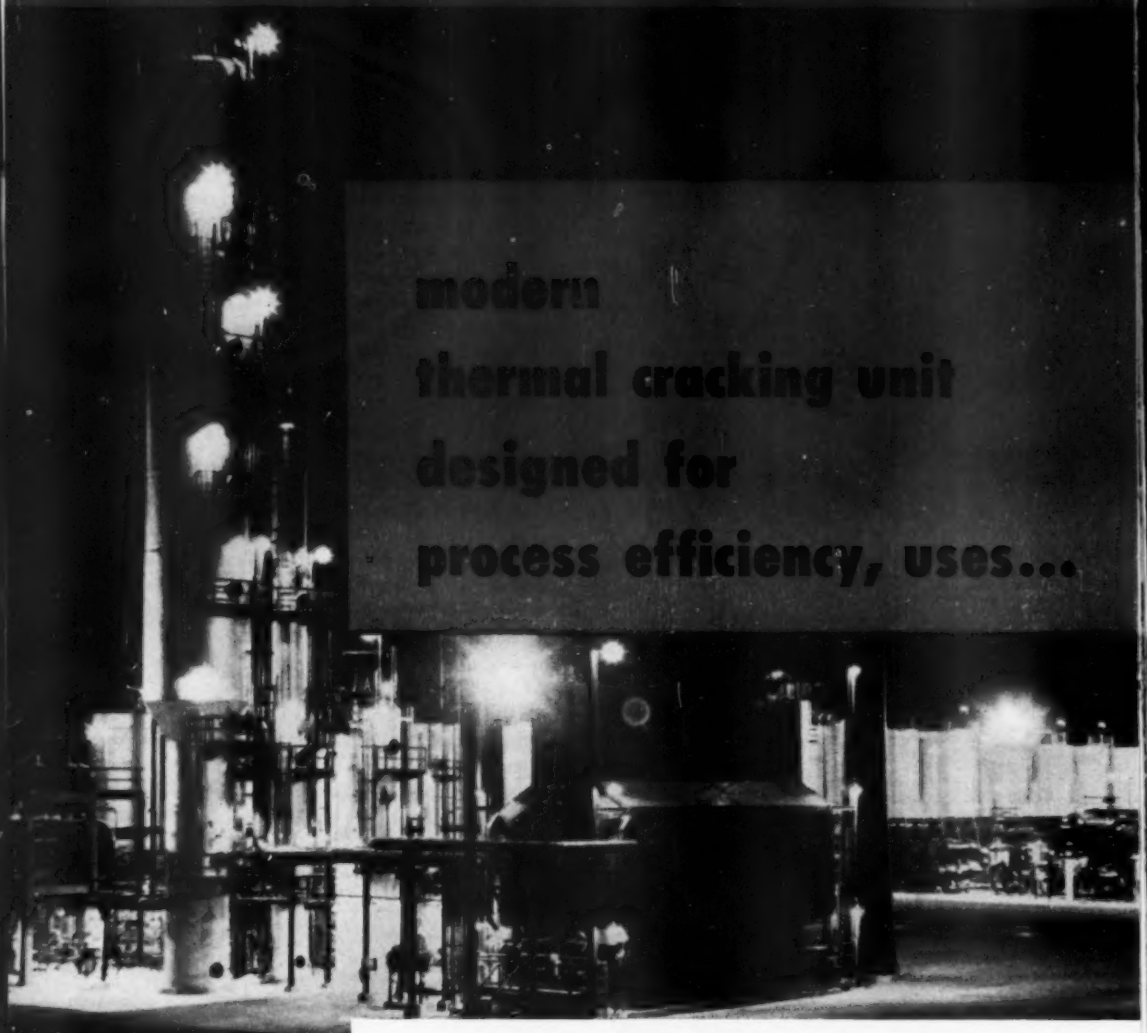
Westinghouse

GENERAL-PURPOSE TURBINES

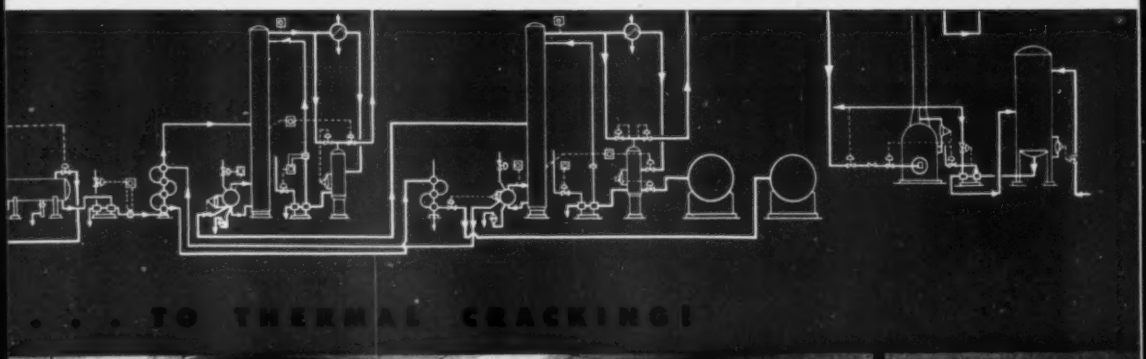


BROWN INSTRUMENTATION*
IS THE MODERN APPROACH . . .

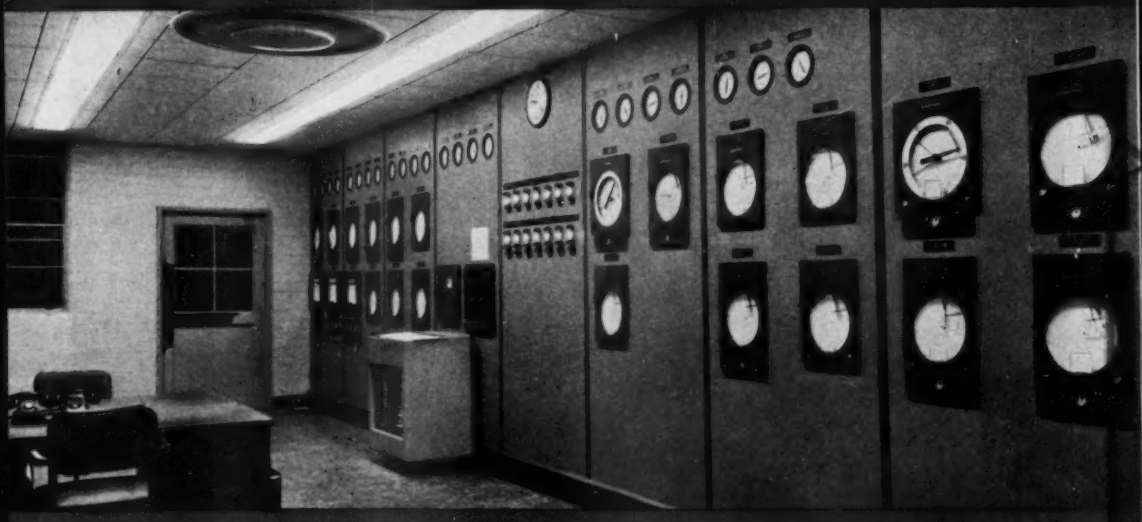
modern
thermal cracking unit
designed for
process efficiency, uses...



* **BROWN INSTRUMENTATION** . . . is patterned to the exact requirements of individual plants and processes . . . is the result of engineering and application know-how, with one responsibility from sensing elements to control valves . . . is backed by a nation-wide field engineering and service organization.



. . . TO THERMAL CRACKING!



BROWN INSTRUMENTS AND CONTROLS

As a result of extensive modernization, Standard Oil Company of California's Bakersfield refinery has been able to increase by 50% the amount of crude oil processed daily.

New facilities at the plant reflect the trend toward high temperature cracking . . . to increase gasoline yields and meet the demand for high octane fuel.

Engineered and constructed by C. F. Braun & Co., the Bakersfield refinery includes Brown Instrumentation for regulating critical process variables on the crude and thermal cracking units. The result is a new high in operating ease and process efficiency.

When looking for recording and controlling instruments for your thermal cracking units, or *any refining operation—consider first:*

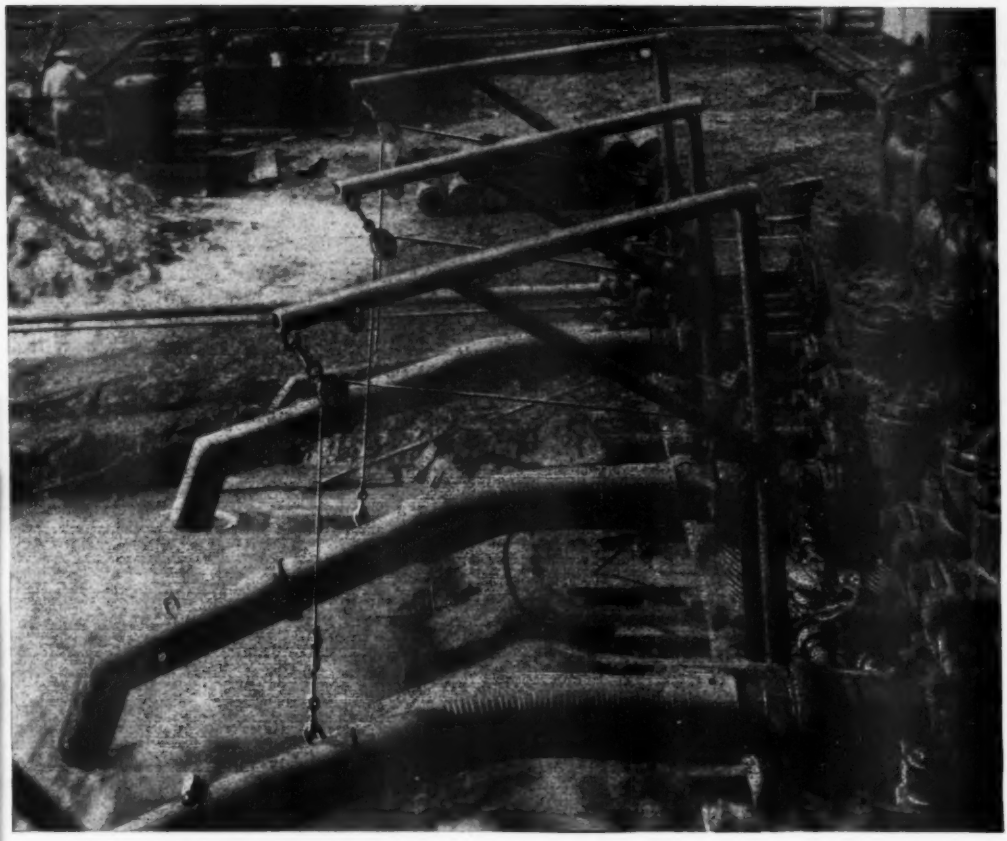
- **The Brown know-how developed through many years of application experience in the industry.*
- **The completeness of the Brown modern approach —recorders, controllers, panelboards (including Graphic Panel) valves, and all accessories.*

Call in our local engineering representative for a detailed discussion of your process control requirements . . . he is as near as your phone.

Minneapolis-Honeywell Regulator Co., *Industrial Division*, 4488 Wayne Avenue, Philadelphia 44, Pa.

MINNEAPOLIS
Honeywell

Brown Instruments



here's photographic proof . . .
you get better service with REPUBLIC MUD PUMP HOSE!

● A close look at this photograph reveals these facts:

(1) All equipment is *dry,* although no cumbersome clamps hold the hose in position. There are no leaks; no lost pumping pressure.

(2) Hose covers are not puckered at the bottom nor stretched at the top of the hose bends. The hose curves smoothly without stress or strain.

(3) No cuts or worn spots are evident, yet this Republic Hose has seen long service on this and other jobs.

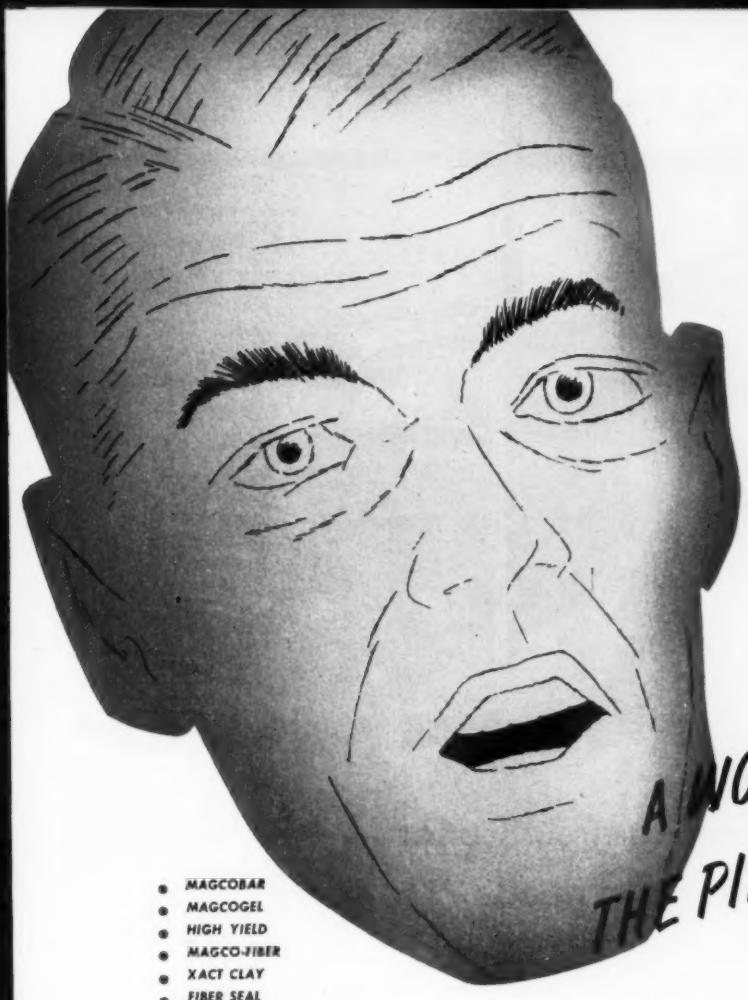
Other features, not visible here, include special smooth bore, abrasion-resisting tubes and strong, flexible round-wire helix reinforcements that prevent collapse from suction.

Add up the facts and we think you too will want Republic Mud Pump Hose working for you —*AND SOON!!!* 6, 8, 10 and 12-inch sizes are available through your local Republic Distributor.

MID-CONTINENT DISTRIBUTORS
Jones & Laughlin Supply Company
Tulsa, Oklahoma
The Bovaird Supply Company
Tulsa, Oklahoma

WEST COAST DISTRIBUTORS
W. C. Hendrie & Company, Inc.
405 Towne Ave., Los Angeles, Calif.
Pacific Coast Rubber Company
51 Main St., San Francisco, Calif

INDUSTRIAL RUBBER PRODUCTS BY
REPUBLIC RUBBER DIVISION
Lee Rubber & Tire Corporation
YOUNGSTOWN, OHIO



A WORD ABOUT THE PIPE SITUATION

- MAGCOBAR
- MAGCOGEL
- HIGH YIELD
- MAGCO-FIBER
- XACT CLAY
- FIBER SEAL
- SALT GEL
- MAGCO-PHOS
- RED OX
- MAGCO-MICA
- TANNATHIN
- JEL-OIL MUD
- JEL-OIL "E"
- "E" CONCENTRATE
- NOHEEVE
- SEAL FLAKES
- MY-LO-JEL PRESERVATIVE
- QUEBRACHO
- CHEMICALS

Magcobar
Complete
DRILLING MUD SERVICE
BAROID

PROTECTIVE MUD CAN OFTEN REPLACE PROTECTION CASING, ALLOWING YOU TO DRILL MORE WELLS WITH YOUR PRESENT CASING ALLOCATIONS.

During 1951 enough steel was allocated to the petroleum industry to drill approximately 43,400 wells. Figures to date indicated that more than 46,000 wells will be drilled before the year ends.

It's a safe assumption that carefully planned drilling mud programs have played a big part in saving the steel necessary for the drilling of these 2600 extra wells.

There are many drilling conditions under which you can stretch your present casing allocations to include extra wells by using protective mud to replace protection casing. Ask your Magcobar field engineer to give you specific examples of how some wells can be drilled without protection casing.

MAGNET COVE BARIUM CORPORATION

ONE OF THE DRESSER INDUSTRIES

HOUSTON, TEXAS • MALVERN, ARKANSAS

Pipe-line communications fitted to your needs

The Bell System provides service tailored to your requirements—service that's up-to-the-minute!

To do this, we work closely with the pipe-line industry. As it progresses and grows, we are continually advancing the science of communications. Our technicians, through actual experience in the field, are always on the alert for ways and means to improve equipment, methods and systems.

We provide—by coaxial cable, microwave radio and wire—a wide variety of services. They include private-line telephone, mobile telephone, teletypewriter, and channels for telephotograph, metering, remote control and other signaling. In these fields our research is continuous and our experience nationwide.

As a result, when we recommend a communications setup for your needs, it includes the best equipment and techniques available.

With Bell System service, pipe-line men are assured of the latest and best communications.

•

Your Bell Telephone Company will be glad to study your communications problems and needs without charge.

PRIVATE-LINE TELEPHONE

TELETYPEWRITER

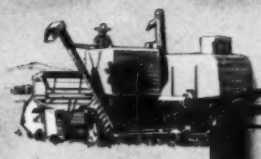
MOBILE TELEPHONE

METERING CHANNELS

BELL TELEPHONE SYSTEM

FIGHTING HEART

...of all this equipment!



Chrysler Industrial 15—one of eight basic models.

CHRYSLER-BUILT INDUSTRIAL ENGINES ARE THE SOURCE OF POWER FOR:

- Ditching Machines
- Cranes
- Truck Mixers
- Shovels
- Loaders
- Yarders
- Concrete Mixers
- Road Pavers
- Crane Carriers
- Scoop Tractors
- Air Compressors
- Hoists
- Derricks
- Pumps
- Generators
- Conveyors
- Tackle Blocks
- Winches
- Tractors
- Combines
- Gang Mowers
- Spreaders
- Irrigation Equipment
- Orchard Sprayers
- Hay Choppers
- Pumps
- Feed Mills
- Sprinklers
- Locomotives
- Motor Coaches
- Drilling Equipment
- Air Conditioning Equipment
- Pulp Machines
- Fire Pumps
- Street Flushers
- Snow Plows
- Oil Well Pumps and Drillers

Original equipment manufacturers the nation over install Chrysler Industrial Engines in their equipment because Chrysler-built means better performance . . . rugged dependability . . . trouble-free operation . . . longer operating life, service everywhere.

Continuous Chrysler research in higher alloy steels and famed Chrysler engineering have produced an industrial engine capable of sustained high speeds with less wear . . . an engine that costs less to operate, less to maintain.

A letter of inquiry will bring you a qualified Chrysler engineer. Address: **Industrial Engine Division, Chrysler Corporation, Detroit 31, Michigan.**

CHRYSLER
Industrial Engines

Meter manifold, Sinclair Pipe Line Co., Harlingen, Texas, using four type 5 PH Rotocycle meters with straight reading, set back type registers. All lines are Nordstrom valve controlled.

Made to Measure ... for Pipe Line Service

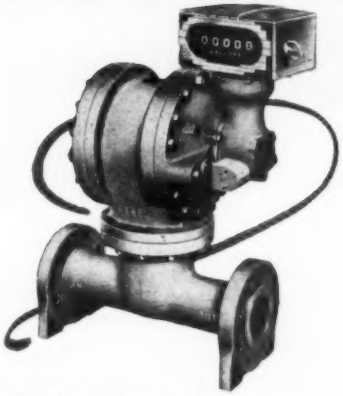
Engineered for precision accuracy, built to stand up under the toughest operating conditions—that's the story in a nutshell of Rockwell meter superiority. That's why you find these meters giving dependable low cost service, day in and day out, on major pipe line systems the country over. They accurately count the barrels as they roll through the line. They put a stop to "guesstimating" throughput, and they protect pipeliners' profits.

Want the finest pipe line meters and the skilled installation engineering counsel that goes with them? Then get in touch with the nearest Rockwell district office or write for informative literature.

ROCKWELL MANUFACTURING CO.

PITTSBURGH 8, PA.

Atlanta Boston Chicago Columbus Houston Kansas City Los Angeles New York Pittsburgh San Francisco Seattle Tulsa



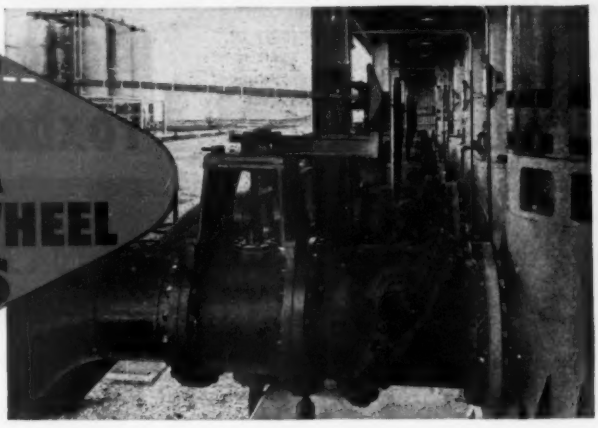
Model 5 PH Rockwell Rotocycle meter with straight reading register recording in either gallons or barrels. One of five sizes, all especially designed to measure either crude or finished products at pipe line entry or take-off points.

ROCKWELL *ROTOCYCLE* METERS

R-S valvEvents

• EXCERPTS FROM THE R-S BOOK OF EXPERIENCE •

SIX HANDWHEEL TURNS



. . . Operate these R-S Valves

This installation of twenty-inch valves in the water system to one of the large oil refineries in Louisiana is another example of R-S time-saving efficiency. Such ease of operation is an important consideration in any pumping operation and especially where a battery of synchronous driven pumps discharges into a common header. Burned-out motors at start-ups can be practically eliminated.

Substantial savings in pumping power result due to the low pressure drop. The beveled vane ordinarily seated at a 12½° angle means greater control rangeability either manual or automatic and no down-time for cleaning.

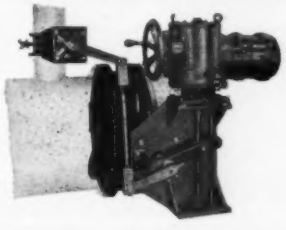
Install easily operated R-S Valves and obtain the most from your valve investment. Your local R-S representative is a valve expert—know him well.

R-S PRODUCTS CORPORATION

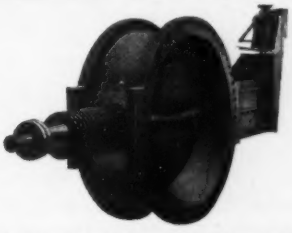
4600 Germantown Avenue, Philadelphia 44, Pa.

An S. Morgan Smith Company Subsidiary

REPRESENTATIVES IN PRINCIPAL CITIES



No. 798—Thirty-six inch and eight-inch R-S heavy duty valves of R-S "H" Metal at elevated temperatures for foundry cupola control. When the larger valve is wide open, the smaller valve is fully closed and vice versa. Slow operation is required, hence the motor operator with threaded reachrod.

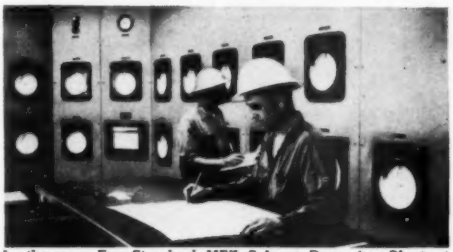


No. 735—72-inch 125-pound "H" Metal R-S Valve for elevated temperatures. Valve is equipped with dual cooling fins. Oil cylinder and positioner utilizes 200 psig oil and 0-15 psig instrument air. Positioner cam driven simulating straight line semi-log control curve.

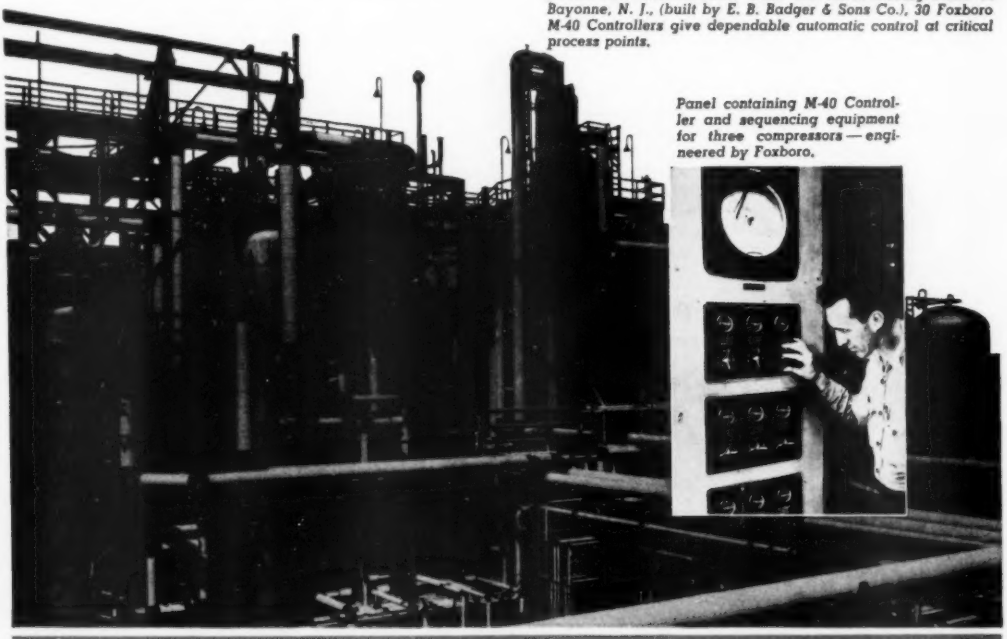
again... Esso Pioneers with Advanced Foxboro Controls!

In the new MEK Solvent Dewaxing Unit completed May 15, 1950, Esso-Standard Oil Company at Bayonne, N. J., cut costs and assured greater controllability of the entire process by means of the Foxboro Model 40 Controllers at many critical points. In addition, an economical feedback intercooling system, and a notably improved sequence control for the refrigeration compressors, were both developed around the Model 40 Controller.

The new Esso MEK installation typifies the many improved control systems now made possible by the inherent stability of Foxboro M-40 control action. M-40 Controllers give you the most advanced developments in the field of pneumatic instrument design. Available for temperature, pressure, flow, level and other applications. Write for full details. **The Foxboro Company, 6011 Neponset Ave., Foxboro, Mass., U. S. A.**



In the new Esso-Standard MEK Solvent Dewaxing Plant at Bayonne, N. J., (built by E. B. Badger & Sons Co.), 30 Foxboro M-40 Controllers give dependable automatic control at critical process points.



Panel containing M-40 Controller and sequencing equipment for three compressors — engineered by Foxboro.

FOXBORO REG. U. S. PAT. OFF. **M-40 CONTROLLERS**

FACTORIES IN THE UNITED STATES, CANADA AND ENGLAND

Choose MORE than a truck . . .

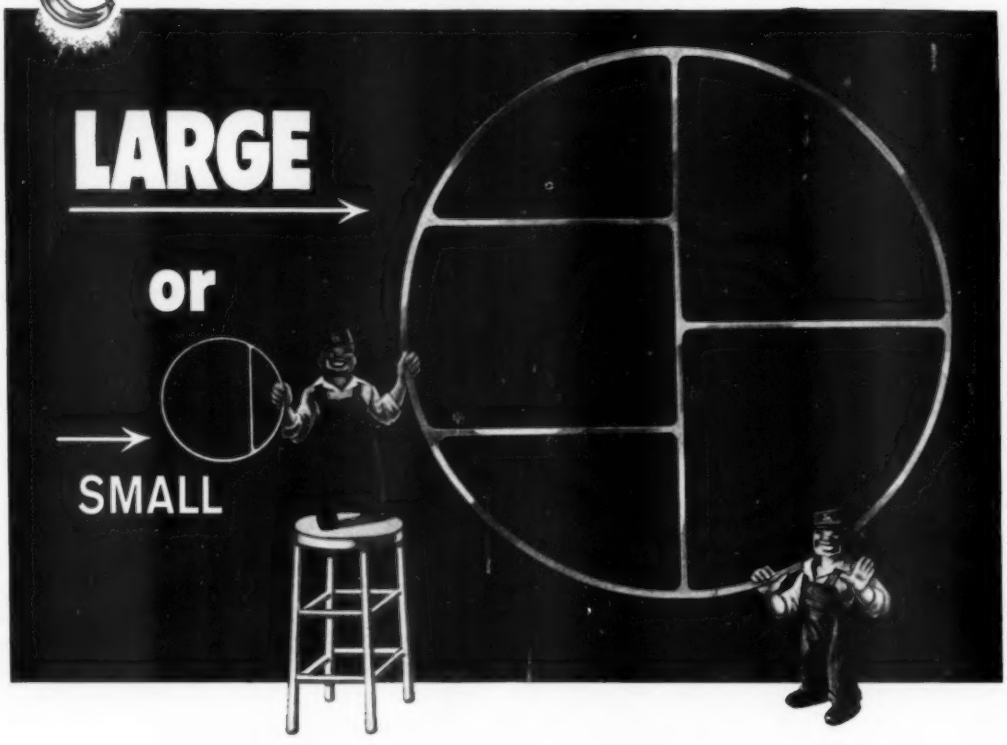
Choose FWD, get greater safety on or off the road

Pipeliners discover that choosing FWDs brings important advantages unmatched by either conventional trucks or conversions. First, of course, FWD gives them outstanding performance over all terrain. But FWDs offer BIG EXTRAS . . . including *up to twice* the truck life . . . far less down-time; lower repair costs; more reliable, faster crew service . . . extra safety for men and equipment *on or off* the highway. All these dollar-saving advantages are created because FWDs have the proper distribution of load and power—which *minimizes stress* and furnishes *extra traction* so important in pipe-line work.

To meet your needs, there are FWD models from 14,500 to 60,000 lbs. GVW—4 and 6 wheel drives. For full facts see your nearby FWD Distributor or contact FWD. The Four Wheel Drive Auto Co., Clintonville, Wis. *Canadian Factory:* Kitchener, Ontario. World-wide sales and service.

America's Foremost Heavy-Duty Truck

Hand-tailored to any size you need...



...Goetze Heat Exchanger Gaskets are precision-made for longer service

Whether your requirements call for heat exchanger gaskets larger than 100" in diameter, or smaller than 10", you can get the exact size you want ... hand-tailored to the shape you need ... simply by specifying "Johns-Manville Goetze."

And because they're *precision-made*, you'll find these better gaskets provide the effective sealing and longer life that make them actually cost less in the long run. Each gasket is carefully constructed in every detail to assure accuracy of fit ... to provide ample lap widths and uniform rib widths ... and to prevent trouble-making wrinkles or cracks on the corners.

If you're having trouble with persistent joint leakage and frequent gasket replacements, find out how little it costs to have Goetze Heat Exchanger Gaskets tailored to your requirements. Your blueprint or template will bring a prompt estimate. Address Johns-Manville, Box 290, New York 16, New York.

Johns-Manville *Goetze* GASKETS

THERE'S A JOHNS-MANVILLE PACKING AND GASKET FOR EVERY SERVICE

Specify this Fast-action Gate for quick, sure STOP and GO services

JENKINS

BRONZE GATE VALVE

125 lbs. Steam
200 lbs. O.W.G.
¼" to 2"

Wherever full, free flow is essential . . . where valve opening and closing must be instantaneous . . . Jenkins SWINGTITE Fast-Action Bronze Gate Valves are setting new standards of performance and endurance.

The exclusive rolling disc and guide track design in the new Jenkins SWINGTITE distributes the wear, assuring maximum tightness (since it prevents uneven wear of seating surfaces), and lengthens valve life.

Use the SWINGTITE wherever fast-action valves take a beating on your processing lines. Compare it for long life and low maintenance. Prove for yourself that day after day it opens freely for full flow, and, closed, it seats tight and *stays* tight.

Ask your Jenkins Distributor for the folder, Form No. 196, describing the SWINGTITE in detail. Or write: Jenkins Bros., 100 Park Ave., New York 17; Jenkins Bros., Ltd., Montreal.

SOLD THROUGH LEADING INDUSTRIAL DISTRIBUTORS

SETTING NEW RECORDS FOR LONG LIFE AND LOW MAINTENANCE IN

Oil refineries
Textile finishing plants
Chemical and food plants
Pulp and paper mills
Mines and mineral refining

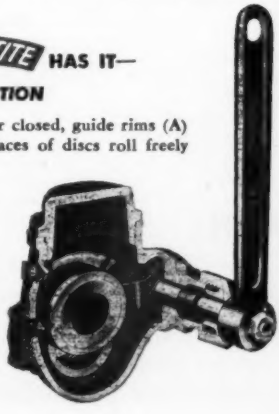
AND IN SUCH APPARATUS AS

Laundry machinery
Dish-washing equipment
Gasoline and fuel oil lines on motors, burners, etc.
Fire extinguishing steam lines

ONLY THE SWINGTITE HAS IT—

ROLLER ACTION

As the valve is opened or closed, guide rims (A) around the seating surfaces of discs roll freely over guide tracks (B) cast in the body, distributing wear evenly, dislodging foreign matter, and providing a polishing action for seating surfaces. This rolling disc and track construction lengthens valve life and assures maximum tightness.

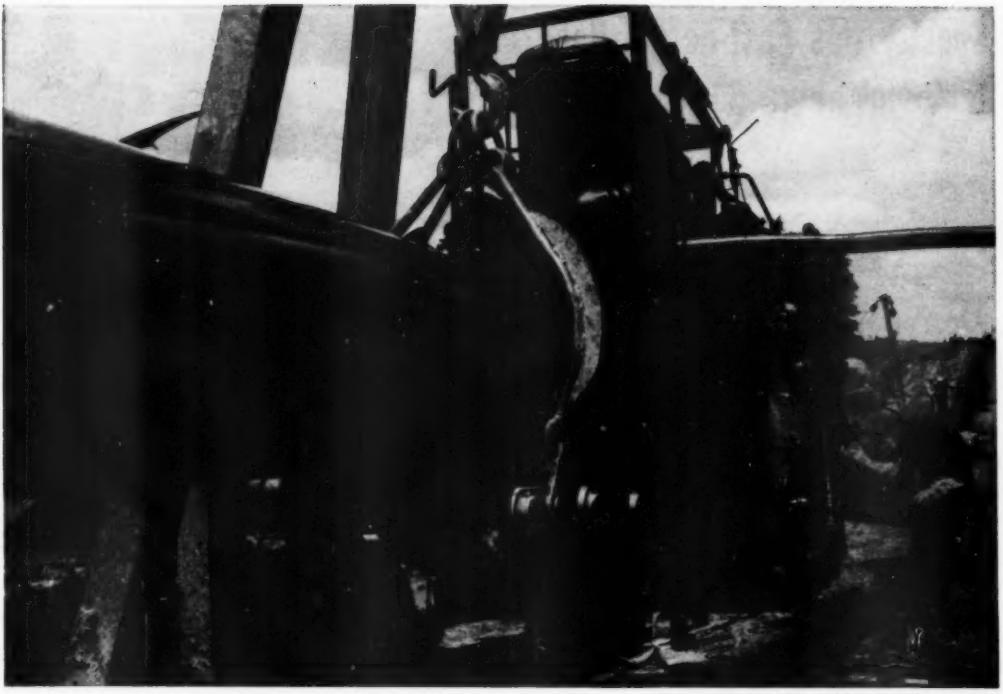


JENKINS VALVES

LOOK FOR THE DIAMOND MARK

SINCE 1864 TRADE JENKINS MARK

Jenkins Bros



Koppers Bitumastic Enamel being machine-applied

Most effective barrier against corrosion —BITUMASTIC® ENAMEL

KEEP moisture away from pipe-line surfaces with a protective coating and you prevent corrosion. It's as simple as that, in theory. In actuality, though, there's more to the story . . . *ordinary* coatings just can't keep out moisture, year after year.

But Bitumastic Enamels can!

These durable enamels are processed from a base of coal-tar pitch, *making them actually impervious to moisture.* They make a tight bond with the pipe. They do not disintegrate with age. They are chemically resistant to soil elements, and maintain continuously high electrical resistance.

And these qualities pay off. Many of this country's pioneer oil and gas pipe lines—laid in the 1920's—are still giving good service today, thanks to the effective protection provided by Bitumastic Enamels.

Protect your pipe lines, the sure way, by specifying "Bitumastic Enamels." Your Koppers representative will give you complete details and estimates.

Bitumastic Enamels soon available from Koppers new California Plant!

As soon as present construction work is completed, Koppers will be able to supply Bitumastic Enamels from a new plant at Fontana, California. The plant is being built to give you better service in the West.

KOPPERS BITUMASTIC ENAMELS
REG. U.S. PAT. OFF.

KOPPERS COMPANY, INC., Tar Products Division, Dept.1151-T, Pittsburgh 19, Pa.

DISTRICT OFFICES: BOSTON, CHICAGO, LOS ANGELES, NEW YORK, SAN FRANCISCO AND WOODWARD, ALABAMA

Complete

R·P&C VALVES

FIG. **409** Bronze Globe Valve

When you choose R-P&C Valves,

you can be sure of the same high quality of each one—from tiny ⅛" valves . . . to high-pressure, high-heat valves . . . and giant valves for handling huge volumes of liquids.

- You can get bronze, iron, steel—bar stock—iron cocks—and cast steel fittings. Two new numbers are PRESSURE SEAL BONNET and FORGED STEEL GATE. More new ones to come.
- Call your local R-P&C distributor today or write the nearest R-P&C district office.

R-P & C VALVE DIVISION
AMERICAN CHAIN & CABLE

"Intentionally Better"
READING-PRATT & CADY VALVES

Thermoid
Industrial Rubber Products
Quality Value Service

Thermoid Trioflex Rotary Hose makes new friends among old timers

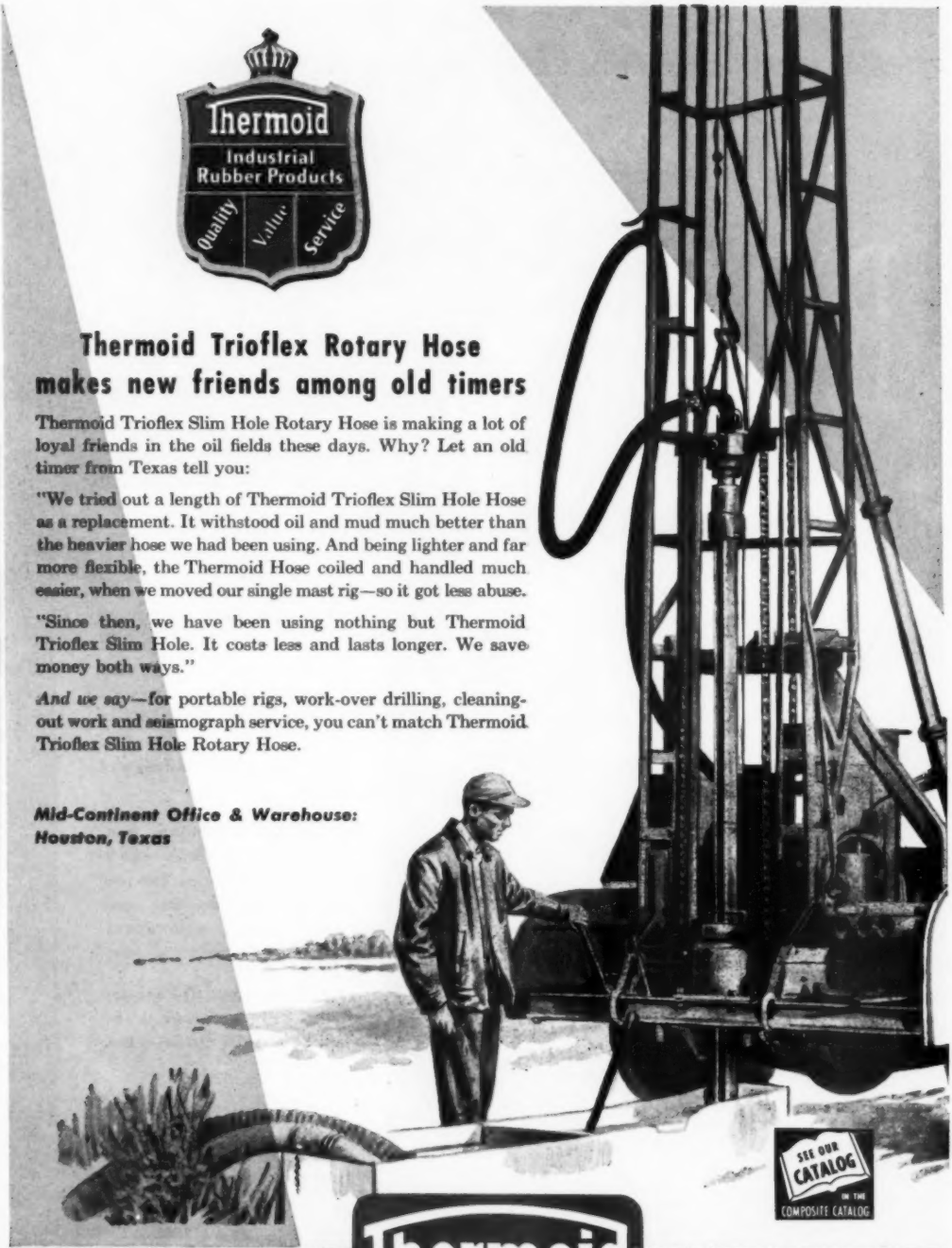
Thermoid Trioflex Slim Hole Rotary Hose is making a lot of loyal friends in the oil fields these days. Why? Let an old timer from Texas tell you:

"We tried out a length of Thermoid Trioflex Slim Hole Hose as a replacement. It withstood oil and mud much better than the heavier hose we had been using. And being lighter and far more flexible, the Thermoid Hose coiled and handled much easier, when we moved our single mast rig—so it got less abuse.

"Since then, we have been using nothing but Thermoid Trioflex Slim Hole. It costs less and lasts longer. We save money both ways."

And we say—for portable rigs, work-over drilling, cleaning-out work and seismograph service, you can't match Thermoid Trioflex Slim Hole Rotary Hose.

Mid-Continent Office & Warehouse: Houston, Texas



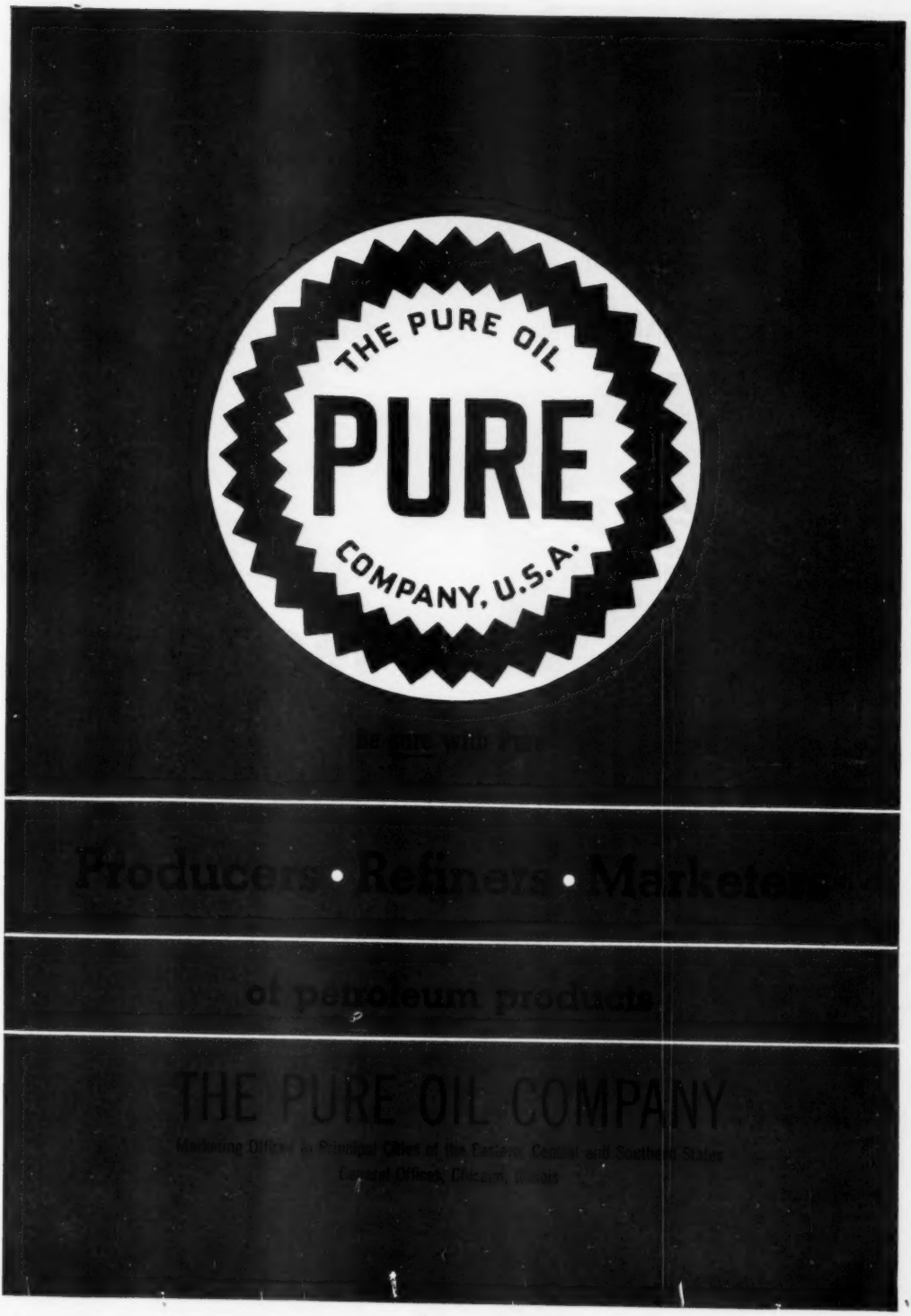
SEE OUR CATALOG IN THE COMPOSITE CATALOG

Thermoid

Powerflex Rotary Hose • Trioflex Slim-Hole Rotary Hose • Mud-Flo Slush Pump Hose • Flexible Discharge Units • F.H.P. and Multiple V-Belts • Oil Country Flat Belting

Wire Line Turn Backs • No-Wip Line Savers • Stuffing Box Rings • All Types of Hose • Molded Specialties • Brake Blocks

Thermoid Company • Offices & Factories: Trenton, N. J., Nephi, Utah


THE PURE OIL
PURE
COMPANY, U.S.A.
Producers • Refiners • Marketers
of petroleum products
THE PURE OIL COMPANY

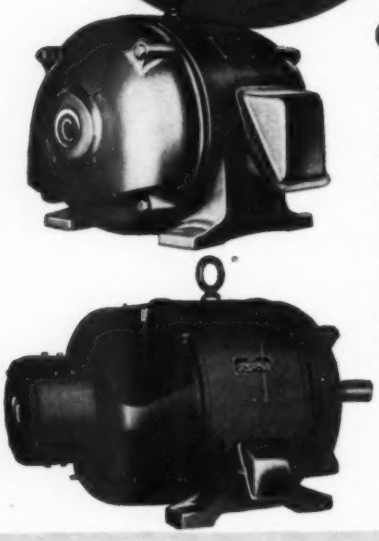
For Steady, Economical Pumping

Century Splash Proof Type SCT squirrel cage motor on an oil field pumping unit.

Century

TYPE SCT

Protected MOTORS



Century Type SCT "high slip" pumping unit motors save wear and tear on equipment. This high slip characteristic permits the motor to slow down as the load comes on. This cushions the impact of the peak load and minimizes the sudden shock to both motor and equipment.

Century Splash Proof Motors assure continuous production in any kind of weather.

Thousands of Century splash proof motors have been operating, out in the open, in rain, snow, sleet and ice, since their development 16 years ago.

They are widely used for the operation of oil well and irrigation pumps, cooling towers, river lock and dam installation and where the equipment is regularly washed down, etc.

Century builds a wide range of motors for oil producing, refining and distributing. Specify Century for all your electric power requirements.

See your nearest supply store for complete information.

CENTURY ELECTRIC CO.
1806 Pine St., St. Louis 3, Mo.
Offices and Stock Points in Principal Cities

Century Electric Company is Celebrating Its 50th Year in the Electrical Industry.

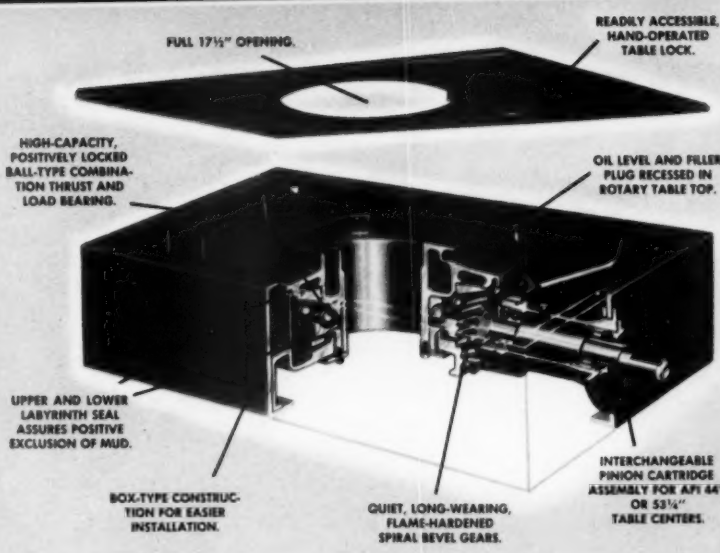
Century C MOTORS

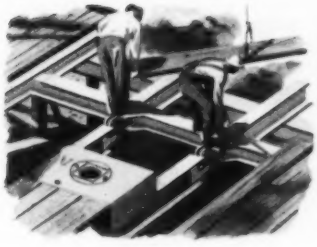
201

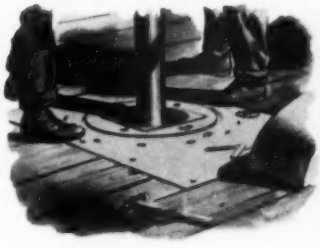
Century GENERATORS—

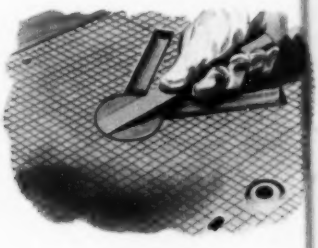
Where public service current is not available, Century Generators will provide adequate, continuous electric power. Depending on the load per motor and the size of generator, from 10 to 30 wells can be operated from one generator. They provide a dependable source of oil field power.

Emsco's New "0-17½" Rotary


FULL 17½" OPENING.
READILY ACCESSIBLE, HAND-OPERATED TABLE LOCK.
HIGH-CAPACITY, POSITIVELY LOCKED BALL-TYPE COMBINATION THRUST AND LOAD BEARING.
OIL LEVEL AND FILLER PLUG RECESSED IN ROTARY TABLE TOP.
UPPER AND LOWER LABYRINTH SEAL ASSURES POSITIVE EXCLUSION OF MUD.
BOX-TYPE CONSTRUCTION FOR EASIER INSTALLATION.
QUIET, LONG-WEARING, FLAME-HARDENED SPIRAL BEVEL GEARS.
INTERCHANGEABLE PINION CARTRIDGE ASSEMBLY FOR API 44" OR 53¼" TABLE CENTERS.







EASIER TO INSTALL

Flooring up around Emsco's new, lightweight, "0-17½" rotary is made simple and easy. Because of its rectangular shape there are no intricate floor patterns to cut. Wood or metal flooring can be set flush with the top and all four sides. Due to its design, the rotary cradles into the substructure, making it easy to bolt into place.

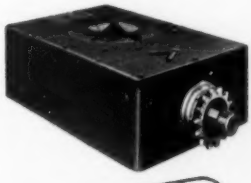
PROVIDES SAFER FOOTING

The flat table top of the "0-17½" is free of all obstructions. This assures safer footing during making up and breaking out operations. Oil level, filler plug and table locking lever are recessed in the top of the rotary table making them easy and convenient to reach, regardless of table setting or flooring arrangement.

ELIMINATES SHOCK DAMAGE

The table locking lever of the "0-17½" rotary locks the body only. As a result, the tonging shock load is not transmitted through the bearings and gears. This eliminates one of the major causes of gear and bearing damage, and assures longer service and lower upkeep. The "0-17½" is available for API 44" and 53¼" settings. The table opening is a full 17½".

Call CONTINENTAL for detailed information, or write for rotary bulletin F-185.



EMSCO DERRICK & EQUIPMENT COMPANY

Houston, Texas • LOS ANGELES, CALIFORNIA • Garland, Texas

H 106-F—1951

EMSCO D+B

EMSCO

REG. U.S. PAT. OFF.

CONTINENTAL

"SERVING THE OIL AND GAS INDUSTRIES"

THE CONTINENTAL SUPPLY COMPANY, General Offices: DALLAS, TEXAS

Export Div.: The Continental Supply Co., Inc., 30 Rockefeller Plaza, New York, N.Y.
The Continental Supply Company, Limited, 216 Lancaster Bldg., Calgary, Alberta

Representatives: Argentina, Bolivia, Brazil, Chile, Colombia, England, Ecuador, Peru, Trinidad, Uruguay, Venezuela

Gives you choice of engines!*

*A chain drive between the engine and hydraulic torque converter gives you complete freedom in the selection of engines. *One or two engines,* of proper horsepower, may be used, *regardless of make or rated engine speed, by merely changing the ratio of the drive sprocket.* At any time during the life of the rig, the engine or engines may be *changed, inexpensively,* should operating conditions make a switch in engines desirable. It is never necessary to change the torque converter in changing engine sizes.

Ruggedness and dependability, usually found only in larger and more expensive rigs, are available in Emsco's light-weight, highly portable GA-250-T. The rig's hydraulic torque converter provides an infinite range of operating speeds . . . eliminates shock-loading, and reduces cost of making holes.

Other features which are increasing the popularity of the GA-250-T for shallow to medium depth drilling and deep work-over operations are:

1. Water-cooled brake rims with fully enclosed forced circulating system.
2. Location of all controls at the driller's console, including one-lever control for hoisting speeds, drum clutch and engine throttle.
3. Direct air-operated friction clutches.
4. Reverse drive and neutral brake as standard equipment.
5. Forced feed lubrication of drawworks, selective speed transmission and engine drive.

For fast, safe, low-cost drilling, make Emsco's GA-250-T torque converter rig your first choice. Call CONTINENTAL!

EMSCO DERRICK & EQUIPMENT COMPANY

Houston, Texas • LOS ANGELES, CALIFORNIA • Garland, Texas

EMSCO D+B

EMSCO

REG U.S. PAT. OFF.

H 106-B — 1951

CONTINENTAL

"SERVING THE OIL AND GAS INDUSTRIES"

THE CONTINENTAL SUPPLY COMPANY, General Offices: DALLAS, TEXAS

Export Div., The Continental Supply Co., Inc., 30 Rockefeller Plaza, New York, N.Y.
The Continental Supply Company, Limited, 316 Lancaster Bldg., Calgary, Alberta

Representatives: Argentina, Bolivia, Brazil, Chile, Colombia, England, Ecuador, Peru, Trinidad, Uruguay, Venezuela

TRET·O·LITE

For effective, economical assistance on any production problem involving emulsified crude, down-the-hole corrosion, scale accumulation, oil-in-water emulsions or paraffin difficulties, call on TRET-O-LITE.

There's a service engineer in or adjacent to every producing field.

TRETOLITE COMPANY

Chemicals for the Petroleum Industry

ST. LOUIS 19, MISSOURI
LOS ANGELES 22, CALIFORNIA

DEHYDRATING • SCALE PREVENTION • CORROSION INHIBITION
DESALTING • WATER DE-OILING • PARAFFIN REMOVAL

T 51-2

CHASE ANTIMONIAL ADMIRALTY *(A patented alloy)*

If you want heat exchanger tubes that will stand up for years under tough conditions, remember... Chase Antimonial Admiralty* Heat Exchanger Tubes last longer! It's the antimony that does it!

These great heat exchanger tubes have enough antimony to resist dezincification. And antimony will not weaken the tube. The metal starts with the right grain structure and retains it... it stays tough and withstands the stresses of heavy duty assignments.

You'll do better with Chase Antimonial Admiralty Heat Exchanger Tubes! Send coupon for FREE Book.

*U.S. Pat. No. 2,061,921

CHASE WAREHOUSE STOCKS:
NEW YORK, BALTIMORE,
NEW ORLEANS, LOS ANGELES
Also carried by
Vinson Supply Co., Tulsa,
Standard Brass & Mfg. Co., Houston.

FREE CHASE BOOK discusses corrosion problems and selection of proper alloy for condenser and heat exchanger tubes.

Chase Brass & Copper Co., Dept. OGJ 1151
Waterbury 20, Conn.
Please send me your free book on Condenser and Heat Exchanger Tubes.

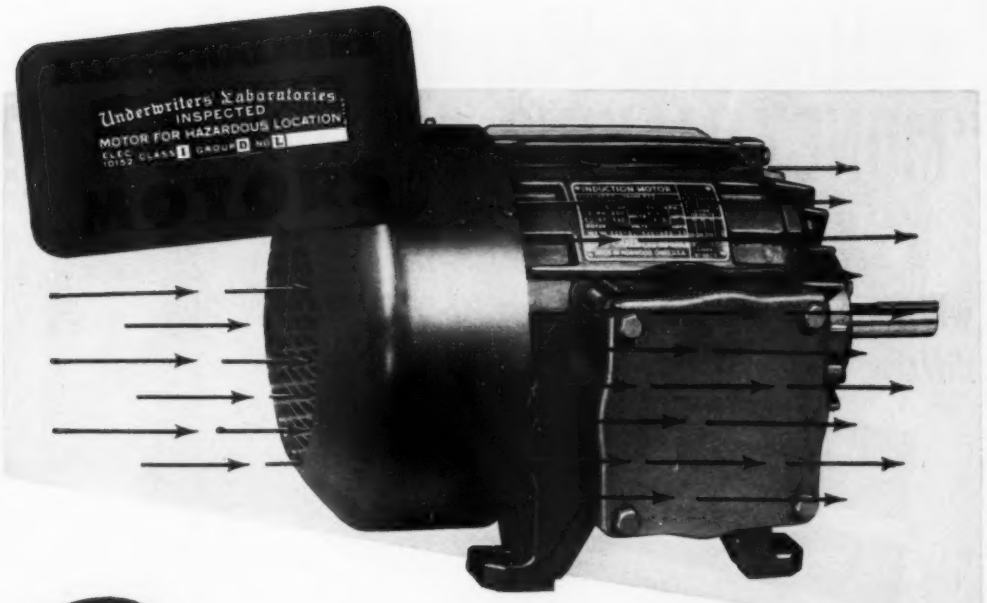
Name _____
Firm _____
Position _____
Address _____
City _____ **State** _____

Chase BRASS & COPPER

WATERBURY 20, CONNECTICUT • SUBSIDIARY OF KENNECOTT COPPER CORPORATION

• *The Nation's Headquarters for Brass & Copper*

Albany†	Cincinnati	Houston†	Minneapolis	Pittsburgh	Seattle	CHASE 75th ANNIVERSARY 1876 1951
Atlanta	Cleveland	Indianapolis	Newark	Providence	Waterbury	
Baltimore	Dallas	Kansas City, Mo.	New Orleans	Rochester†		
Boston	Denver†	Los Angeles	New York	St. Louis	(Tubes office only)	
Chicago	Detroit	Milwaukee	Philadelphia	San Francisco		



Blows itself clean as a Whistle!

DIRT IS CARRIED AWAY by cooling air blown over the ribbed cast iron frame and bearing housings of this new Allis-Chalmers explosion proof motor. That means less motor cleaning . . . inspection . . . overhaul!

Concealed air passages and pockets have been eliminated. Dirt can't build up to cause overheating. And as for oily dirt, that sticks — just wipe or blow it off.

This means savings. This new Allis-Chalmers Type APZZ explosion proof motor makes maintenance costs lower than ever before.

Rigid Construction

The frame is cast iron which has high resistance against corrosion and distortion. Bearings are pre-lubricated at the factory and should need no attention for years. Tapped holes with pipe plugs to permit regreasing and to provide grease relief are standard equipment

Get All The Facts

The new Allis-Chalmers Type APZZ explosion proof motor is built in all NEMA standard frame sizes from 224* to 505. Also built in totally-enclosed, fan-cooled type. Your nearby Allis-Chalmers Distributor or Sales Office has complete information on this new motor. Call today, or write Allis-Chalmers, Milwaukee 1, Wisconsin. Ask for Bulletin 51B7286.

A-3477

Sold . . .
Applied . . .
Serviced . . .

by Allis-Chalmers Authorized Dealers, Certified Service Shops and Sales Offices throughout the country.

CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

TEXROPE — Belts in all sizes and sections, standard and *Vari-Pitch* sheaves, speed changers.

PUMPS — Integral motor and coupled types from ¾ in. to 72 in. discharge and up.

Texrope and *Vari-Pitch* are Allis-Chalmers trademarks.

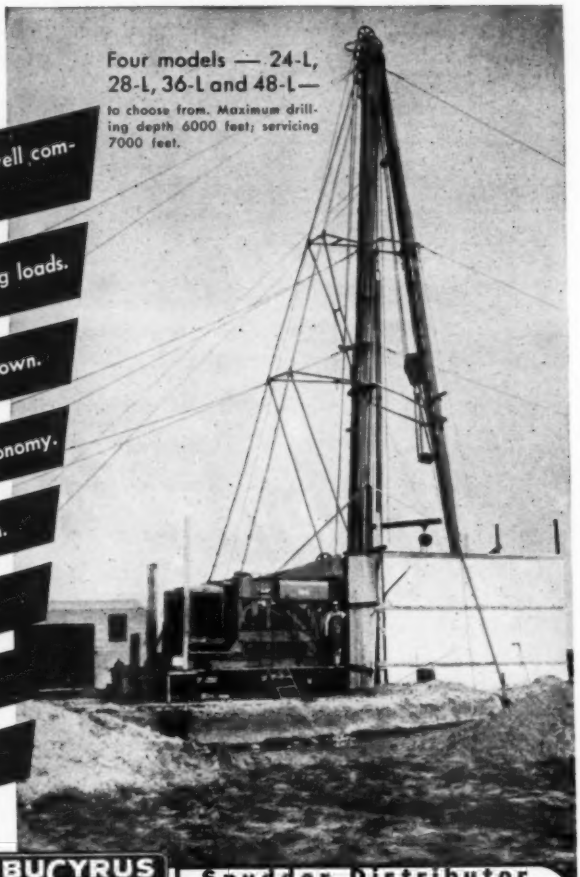
ALLIS-CHALMERS

*Similar design non-ventilated motors Type APKK also available in frames 203 to 224 inclusive.

How Many Ways Can You Prove "MONEY MAKING PERFORMANCE"?

A Bucyrus-Erie spudder will prove it for you eight different ways:

1. Versatility for handling drilling, well completion and workover jobs.
2. Capacity for big tool and casing loads.
3. Easy rigging-up and tearing down.
4. Outstanding maintenance economy.
5. Sharp snappy drilling action.
6. Time-saving mobility.
7. Easy accessibility.
8. Long rope life.



Four models — 24-L, 28-L, 36-L and 48-L— to choose from. Maximum drilling depth 6000 feet; servicing 7000 feet.

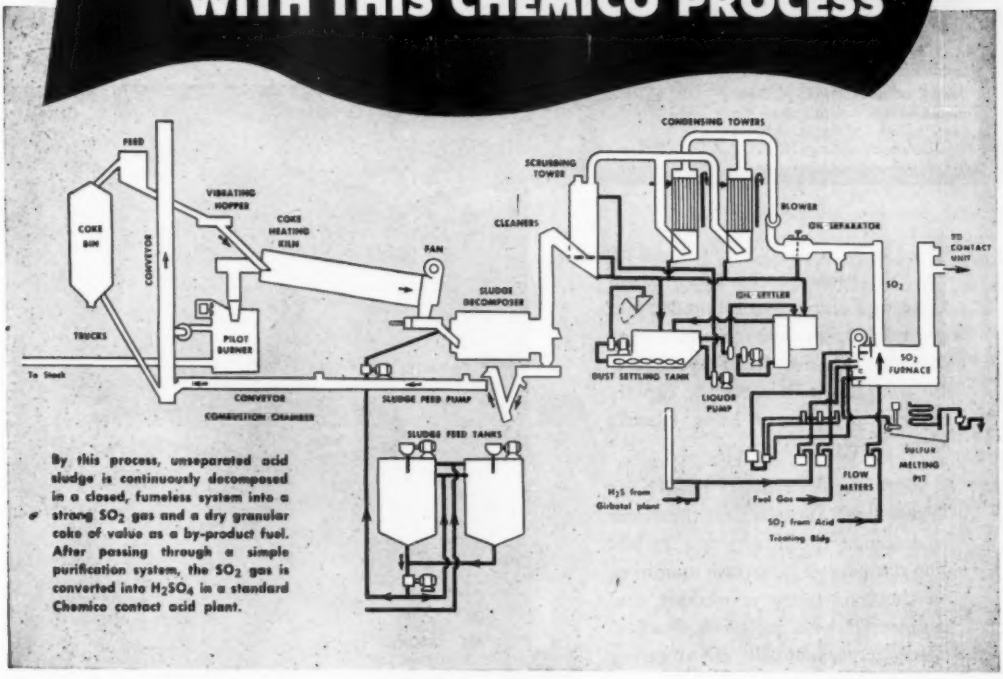
See or Write Your BUCYRUS ERIE Spudder Distributor

BEACON SUPPLY CO - - - Borger and Pampa, Texas
BECKWITH MACHINERY CO., Pittsburgh and Bradford, Pa.
BUCKEYE SUPPLY COMPANY - - - Zanesville and Wooster, Ohio; El Dorado and Chase, Kan.
DRILLERS SUPPLY CO. - - - - - - - Joplin, Mo.
DRILLING & MINING EQUIPMENT CO. - - - - - Los Angeles 21, Calif.
GREAT NORTHERN TOOL & SUPPLY CO. - - - - - Billings, Kevin and Cut Bank, Mont.; Casper, Wyo.
IVERSON SUPPLY CO. — Oklahoma City, Okmulgee and Tulsa, Okla.; Ft. Worth, Kermit, Odessa, Snyder, Houston and Midland, Tex.; Artesia and Farmington, N. M.
LUCEY EXPORT LTD. - - Calgary and Edmonton, Alta.
THE McJUNKIN SUPLY CO., Charleston, W. Va.; Allen, Ky.
OLYMPIC SUPPLY CO. - - - - - - Seattle, Wash.
RANDALL-ZOGG SUPPLY CO. - - - - Princeton, Ind.
THE STRAKER SUPPLY - - - - - Mt. Pleasant, Mich.
TILLSONBURG PIPE & SUPPLY CO - Tillsonburg, Ont.

BUCYRUS-ERIE CO., South Milwaukee, Wisconsin — *First with the Finest in Spudders*

Make Sulfuric Acid from Refinery Sludge

WITH THIS CHEMICO PROCESS



By this process, unseparated acid sludge is continuously decomposed in a closed, fumeless system into a strong SO_2 gas and a dry granular coke of value as a by-product fuel. After passing through a simple purification system, the SO_2 gas is converted into H_2SO_4 in a standard Chemico contact acid plant.

With the increasing shortage of raw sulfur, industry is turning to other materials which can be used for making much-needed sulfuric acid. An important source—waste oil refinery sludge—can be converted into clean sulfuric acid of any desired strength by the Chemico process shown in the flow diagram.

This proved and practical process offers three important advantages. (1) The purified SO_2 gas provides a product acid that is free of carbon contamination. (2) The resulting H_2SO_4 may be 98% or any higher strength regardless of the initial strength of the sludge. (3) Sludges that cannot be processed by other methods may be satisfactorily used in this system.

CHEMICAL CONSTRUCTION CORPORATION

A UNIT OF AMERICAN CYANAMID COMPANY

488 MADISON AVENUE, NEW YORK 22, N. Y.

EUROPEAN TECHNICAL REPRESENTATIVE: CYANAMID PRODUCTS, LTD., LONDON W. C. 2, ENGLAND
CABLES: CHEMICONST, NEW YORK

Chemico plants are profitable investments

9E214

LARGE ELLIOTT MOTOR

...drives gas compressor

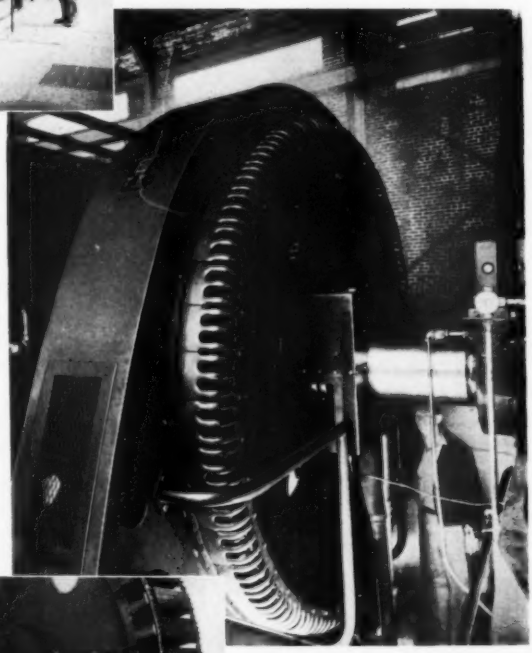
for maximum capacity

The I-R compressor and its Elliott motor in the new plant of the Long Island Lighting Company, at Glenwood Landing, N. Y.

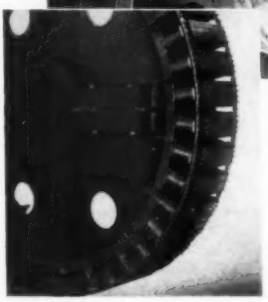
At the new Glenwood Landing (N. Y.) plant of the Long Island Lighting Company an Elliott 2000-hp engine-type synchronous motor drives an Ingersoll-Rand type PRE-2-4C compressor to serve the rapidly expanding needs of Long Island's home developments.

With the flexibility of Elliott "Fabri-Steel" construction, the motor is designed specifically for its job. The rotor is split to permit mounting on the compressor crankshaft, and engineered with sufficient flywheel effect to prevent the reciprocating motion of the compressor from causing objectionable pulsations in the electrical system. Enclosed collector rings eliminate fire hazard.

The many superior construction details of Elliott low-speed synchronous motors are fully covered in Bulletin 5000-2. Address Dept. OG.



Close-up of the motor, showing explosion-proof, ventilated collector ring enclosure, with lucite windows for visual inspection.



The rotor is of full-split construction, with edge-wound copper strap field coils. Starting winding bars are silver-brazed to the end ring segments for low resistance and for permanent tightness.

ELLIOTT COMPANY

RIDGWAY DIVISION • RIDGWAY, PA.

WHY seat misalignment doesn't cause this Darling Valve to leak!

NO gate valve body ever made is entirely immune to distortion caused by line stresses and temperature changes. Yet even slight distortion can throw the seats out of alignment—probably the most common cause of leaky valves and costly replacement.

That's one reason why Darling gate valves, with their unique wedging principle combined with fully revolving double discs and parallel seats, have the jump on other valves. They easily, *automatically* adjust for valve body distortion, cinching tight, leak-proof closure without destructive strong-arm tactics. Most important, you avoid costly down-time and repeated maintenance headaches.

But that's not all! Actually, this Darling principle offers several other equally important time-and-money-saving advantages. In plant after plant they add up to trouble-free performance and longer service life with a very minimum of attention.

GET ALL THE FACTS

Send for descriptive cast steel valve Bulletin No. 5003.

DARLING VALVE & MANUFACTURING CO.
Williamsport 1, Pa.

Manufactured in Canada by Sandilands Valve Manufacturing Co., Ltd., Galt 19, Ontario

NOTE: *Darling gate valves are made in a wide range of sizes, types and constructions, including solid and slotted taper-seat wedge types, for all kinds of normal and corrosive services in pressures up to 1500 pounds.*

FOR PLUS VALUES, JOB-PROVED AGAIN AND AGAIN

AHEAD OF THE TORCH

First there's financing by the FIRST in Dallas

the Southwest's Pioneer Oil Bank

FIRST NATIONAL BANK *in* DALLAS

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

Give us an opportunity to say **yes**

exploring new frontiers

... portable rig equipped with Torrington Bearings

Remote locations are easier to reach with the "2500" Portable Drill manufactured by Geo. E. Failing Supply Co. Mounted on a truck bed or trailer, this self-contained unit can be taken almost anywhere. Once set up, it can drill to a depth of 4,000 feet.

Torrington Spherical Roller Bearings in the crown block and traveling block assure ample capacity to handle this rugged work, including 30,000 pound drill string loads. These self-aligning bearings provide smooth, dependable operation even when shafts are deflected by shock loads. Binding stresses are eliminated, bearing life lengthened, and maintenance requirements reduced.

This combination of high load capacity, automatic self-alignment and easy maintenance has solved many a friction problem for manufacturers of heavy-duty equipment. Torrington Spherical Roller Bearings can do the same for you.

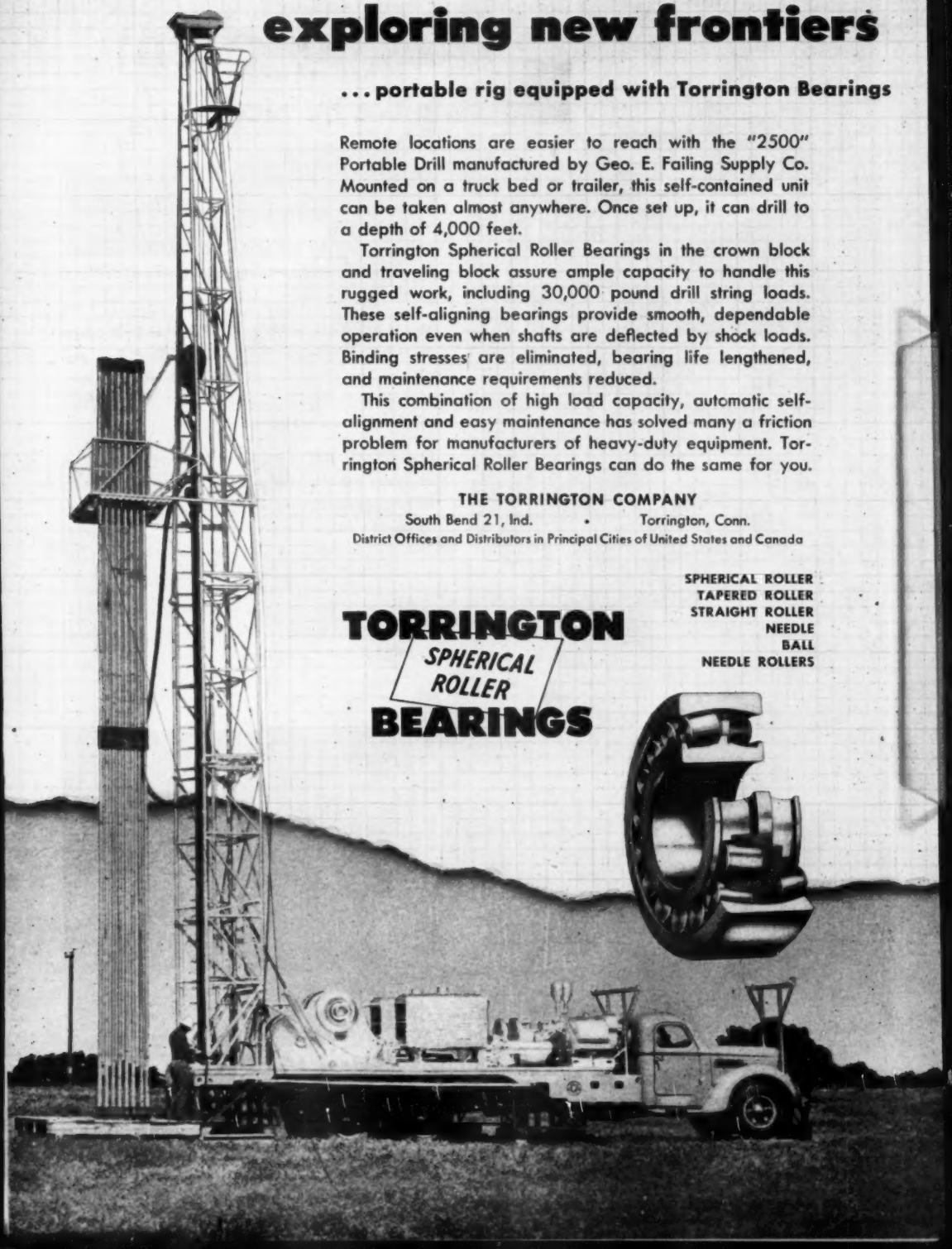
THE TORRINGTON COMPANY

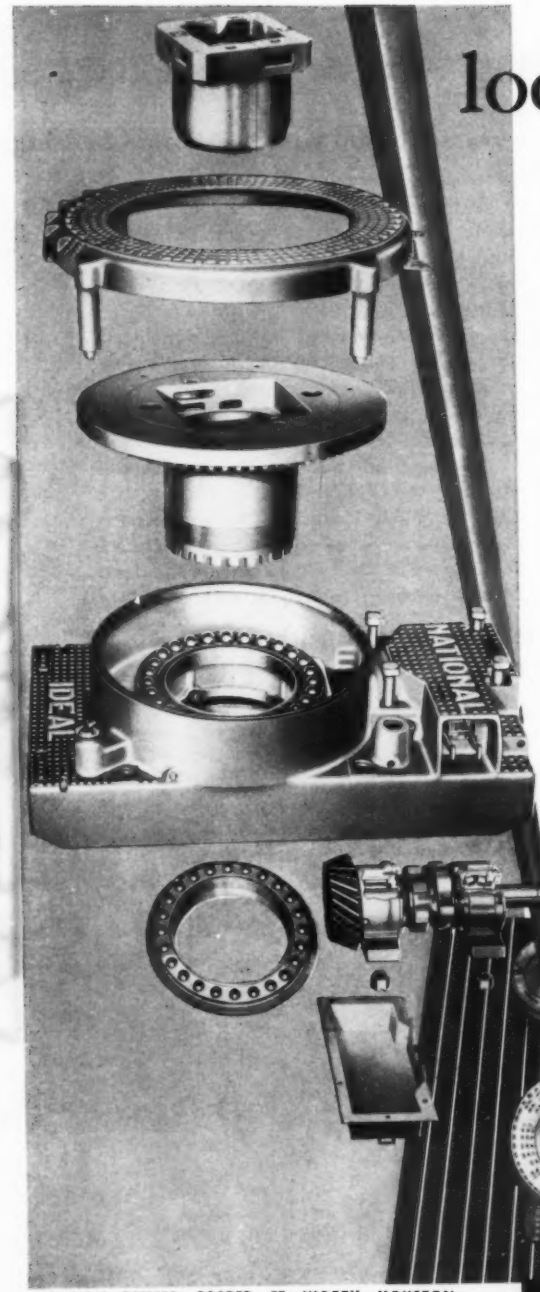
South Bend 21, Ind. • Torrington, Conn.

District Offices and Distributors in Principal Cities of United States and Canada

TORRINGTON
SPHERICAL ROLLER
BEARINGS

SPHERICAL ROLLER
TAPERED ROLLER
STRAIGHT ROLLER
NEEDLE
BALL
NEEDLE ROLLERS





look at them

piece by piece

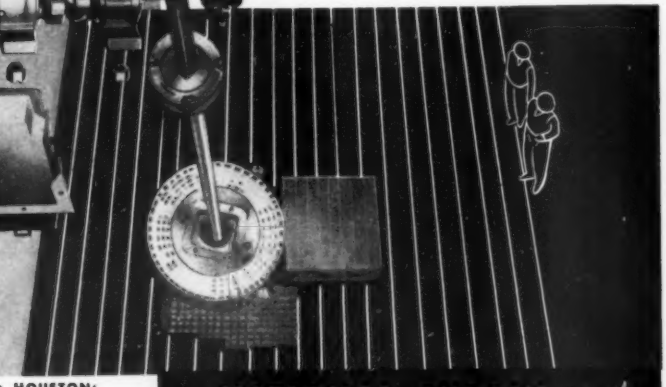
or check the job they're doing

Either way, you'll find IDEAL ROTARIES measure up to your requirements and with plenty of drilling power to spare.

That's because IDEAL ROTARIES, and all other drilling equipment in the "National Blue" line, are built to the standards of work-to-be-done rather than on the basis of first cost. And that's why IDEAL ROTARIES are so economical in the long run.

The IDEAL ROTARY line is complete, too—machines for shallow-hole drilling or high-speed deep-strata operations. Each unit has special construction features for its service range. These are described in detail in bulletins you can obtain by writing The National Supply Company.

In fact, you'll find everything that's new and everything that's standard in drilling equipment at The National Supply Company.



THE NATIONAL SUPPLY COMPANY

General Sales Offices: Toledo, Ohio

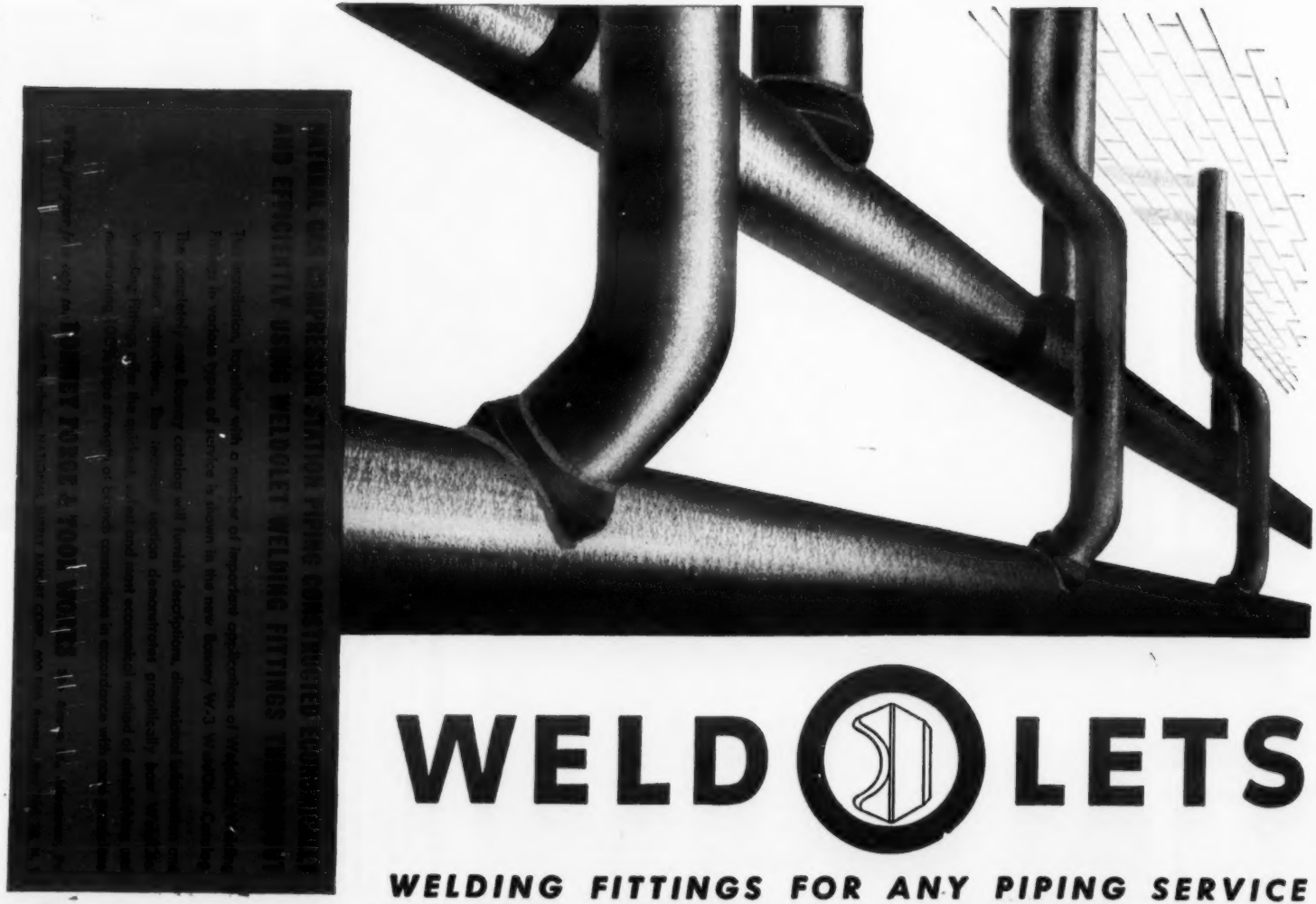
NATIONAL BLUE PRODUCTS

DIVISION OFFICES: CASPER; FT. WORTH; HOUSTON; PITTSBURGH; TULSA; TORRANCE

CANADA: THE NATIONAL SUPPLY CO., LTD., 702 BARRON BLDG., 610 EIGHTH AVE., WEST, CALGARY, ALBERTA

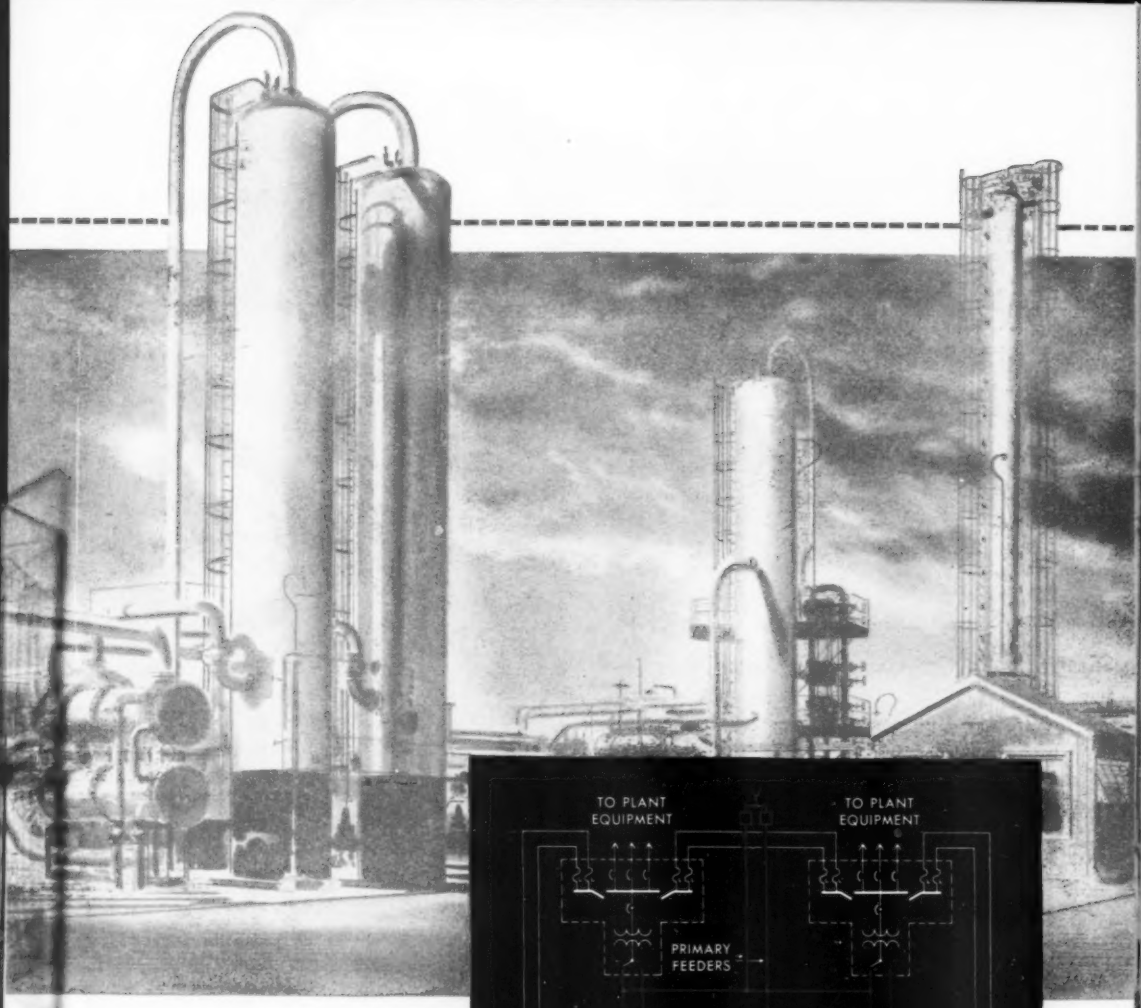
EXPORT: NATIONAL SUPPLY EXPORT CORPORATION, 600 FIFTH AVE., NEW YORK 20, N.Y., U.S.A.; RIVER PLATE HOUSE, 12 SOUTH PLACE, LONDON E.C. 2

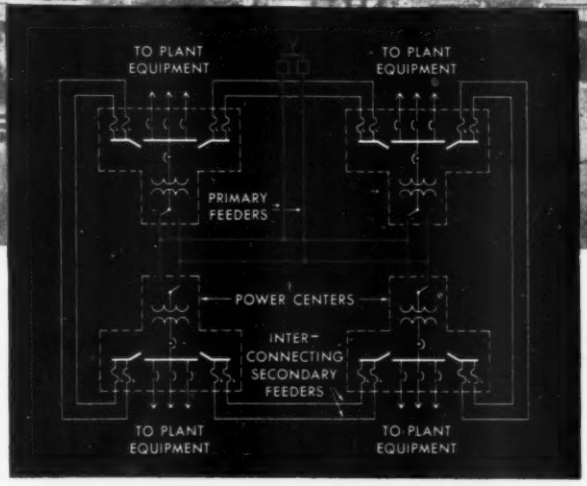
NATIONAL OIL FIELD MACHINERY AND EQUIPMENT • SPANG STEEL PIPE • SUPERIOR & ATLAS ENGINES



WELDOLETS

WELDING FITTINGS FOR ANY PIPING SERVICE





PRIMARY SELECTIVE NETWORK SYSTEM

This system rates high on service continuity and flexibility. Two Primary Feeders supply power. If a fault occurs on one, the other Feeder takes over to keep service continuous. If a fault occurs in a Power Center, its section of the plant is supplied by the adjacent Power Centers through the interconnecting Secondary Feeders.

When additional power is needed, one Primary Feeder supplies the plant while a new Power Center is connected to the dead feeder. The plant keeps operating.

This is one of eleven basic systems, all with varying characteristics. Let experienced Westinghouse engineers help you plan the system best fitted to *your* operations.

Westinghouse

EQUIPMENT FOR THE PETROLEUM INDUSTRY

YOU CAN BE **SURE**.. IF IT'S

Westinghouse

HOW MUCH DOES IT COST

when a distilling column goes "down"?

Probably more than you care to think about. But when power failure is at fault this costly threat can be eliminated. The answer:

A planned power distribution system!

When you modernize existing plants or build new ones, plan a system that *insures* service continuity . . . that gives you *alternate* power routes when electrical troubles occur. Moreover, make sure the system will be flexible . . . to permit load shifts and allow expansion without shutdown.

The Primary Selective Network shown on the opposite page is an example of a system that gives you this important service continuity and flexibility. But this is just one of the many systems you'll want to consider. Each has specific advantages depending on your particular operation. And Westinghouse can help you and your plant contractor design the system that *best* fits your requirements.

To help you make preliminary decisions we've prepared informative material covering all systems. Write for yours now. And remember, when you're building or modernizing, call in your Westinghouse engineers. With wide experience in power problems they can help you plan the one best system for your particular operation. J-94855

HERE'S REAL HELP FOR YOUR SYSTEM PLANNING

"Industrial Plant Distribution Systems": 34 fact-filled pages completely explain the eleven basic systems. Ask for B-4045.

A System Selector: pocket-sized selector card quickly shows the characteristics of each type.

A Full-Color Movie: sound movie dramatizes the economies of system planning. Ask your Westinghouse representative for a free showing.

Get this valuable information now. Call your Westinghouse office or write: Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30, Pa.

when quality counts — SPECIFY → **Tenamene**

the most effective gasoline additives known!

FOR 15 YEARS Tennessee Eastman has manufactured the most effective and efficient gum-inhibiting gasoline additives known to the refining industry.

While the name, TENAMENE, is new to the industry, the products themselves are not. Formerly these inhibitors were sold through another company and under that company's name. Today these additives are available directly from the basic manufacturer.

Whether you have been using these Eastman additives under another name or not, you'll find TENAMENE represents the peak in quality and performance. And more than this, you'll enjoy doing business with Tennessee Eastman.

We will be pleased to send you specifications, prices and samples. Write to Tennessee Eastman Company, Kingsport, Tennessee, or call our nearest sales representative.

WHICH DO YOU NEED?

Tenamene 1

a gum inhibitor for motor fuels →

Specific Gravity, 75°/75°F.	0.89-0.91
Viscosity at 100°F. (Saybolt Universal)	49 secs.
Freezing Point	—27°F.
Flash Point (Tag Closed Cup)	61°F.

Tenamene 2

← *a gum inhibitor for motor fuels and aviation gasolines*

Specific Gravity, 75°/75°F.	0.94-0.95
Viscosity at 100°F. (Saybolt Universal)	63 secs.
Melting Point	>64°F.
Flash Point (Cleveland Open Cup)	285°F.

Tenamene 60

a copper deactivator →

Specific Gravity, 75°/75°F.	1.07
Viscosity at 100°F. (Saybolt Universal)	80 secs.
Freezing Point	—1°F.
Flash Point (Tag Closed Cup)	19°F.

Tenamene EASTMAN GASOLINE ADDITIVES

STOCKS OF TENAMENE are carried in Lodi, New Jersey; Houston; Los Angeles; San Francisco; and Kingsport, Tennessee.

SALES REPRESENTATIVES: New York—10 E. 40 St.; Cleveland—Terminal Tower Bldg.; Chicago—360 N. Michigan Ave.; Houston—412 Main St. **West Coast: Wilson Meyer Co.,** San Francisco—333 Montgomery St.; Los Angeles—4800 District Blvd.; Portland—520 S. W. Sixth Ave.; Seattle—821 Second Ave.

TENNESSEE EASTMAN COMPANY, *Division of Eastman Kodak Company,* KINGSPORT, TENNESSEE

are you overlooking any of these UNIBOLT time labor and money savers in your drilling rig hook-up?

FORGED STEEL AND MALLEABLE COUPLINGS — for slush pump manifolds, mud lines, steam lines, fuel, and water lines.

BIG INCH COUPLING WITH BLANKING PLUG — the original slush pump suction union and blanking plug for compounding pumps.

SLUSH PUMP SUCTION STRAINER — keeps trash out . . . life in . . . pump valves and seats.

FLEXI-BALL JOINT — keeps mud lines and rotary hose out of a bind and facilitates making up misaligned connections.

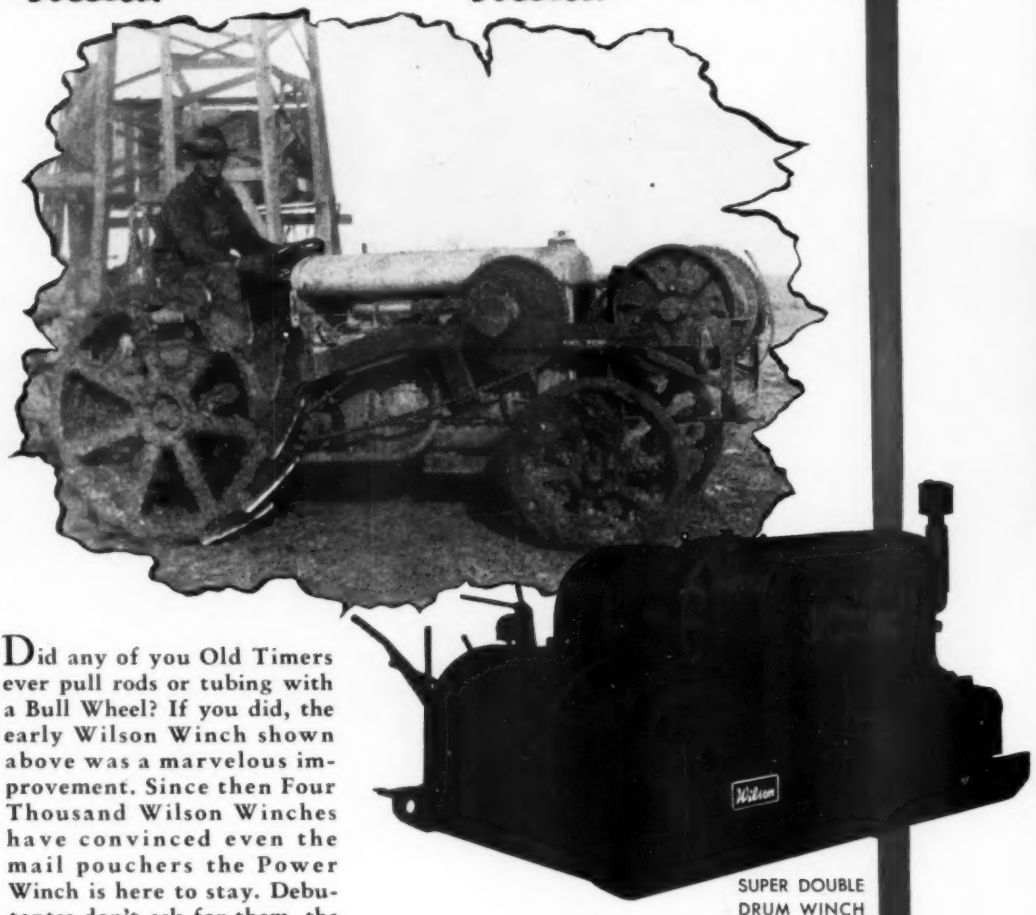
POSITIVE CHOKE BODY — for safe, dependable mud choke manifold service.

THORNHILL-CRAVER COMPANY • Houston, Texas

UNIBOLT

Remember . . . "ABOUT 4000 WINCHES AGO . . ."

Wilson WAS THERE! Wilson WAS FIRST!



SUPER DOUBLE DRUM WINCH

Did any of you Old Timers ever pull rods or tubing with a Bull Wheel? If you did, the early Wilson Winch shown above was a marvelous improvement. Since then Four Thousand Wilson Winches have convinced even the mail pouchers the Power Winch is here to stay. Debutantes don't ask for them, the Roustabouts do!

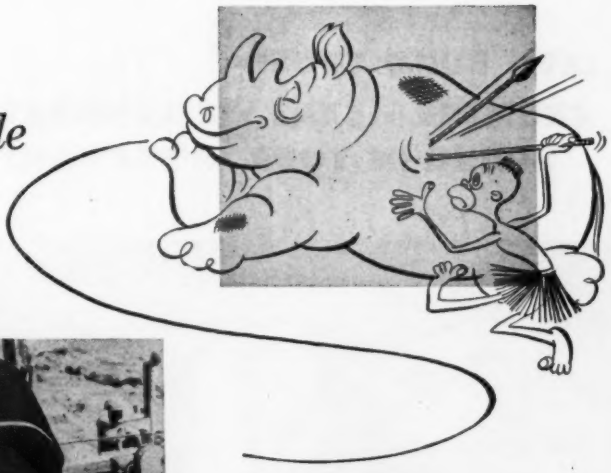
Wilson ADVANCED ENGINEERING GIVES YOU . .

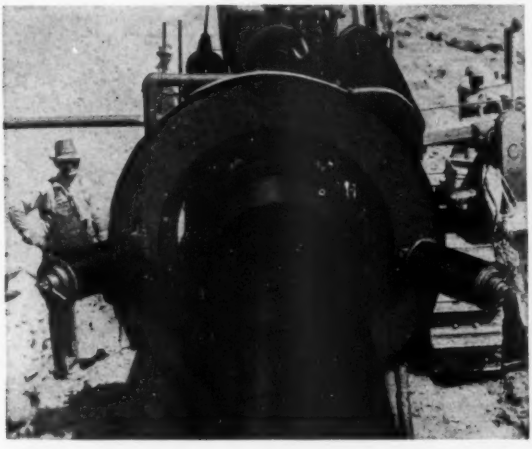
- Better design
- Lower operating cost
- Longer life
- Better performance
- Simpler and easier operation and maintenance

COMPARE QUALITY . . . COMPARE PRICES BEFORE YOU BUY!

Wilson MANUFACTURING CO., Inc.
WICHITA FALLS, TEXAS

Like the Rhino's tough hide that protects what's inside...





Johns-Manville Asbestos Felt protects oil and gas pipe lines

MORE than 100,000 miles of oil and gas pipe lines are now protected by Johns-Manville Asbestos Pipeline Felt—*the only type of wrapper that has survived over 50 years of service in all types of soils.*

Johns-Manville Asbestos Felt is a sturdy, inorganic product. It has the thickness and toughness necessary for shielding pipeline enamels from earth load and soil stresses. It is resistant to rot and decay, and to acid and alkali soils. It permits the protective enamel coating to properly function against corrosion.

Johns-Manville Asbestos Felt is flexible. It wraps easily without cracking. It guards enamel from impact during installation of field-wrapped pipe, or during transportation and installation of mill-wrapped pipe.

There are economic advantages, too. In addition to reducing maintenance expense, Johns-Manville Asbestos Felt adds many years of life to the pipeline. For further information and a sample of Johns-Manville Asbestos Pipeline Felt, mail the coupon below.

Johns-Manville
Asbestos
PIPELINE FELT

Johns-Manville
Box 290, New York 16, N. Y.
Please send me a copy of the sample folder on Johns-Manville Asbestos Pipeline Felt, PP-22A.

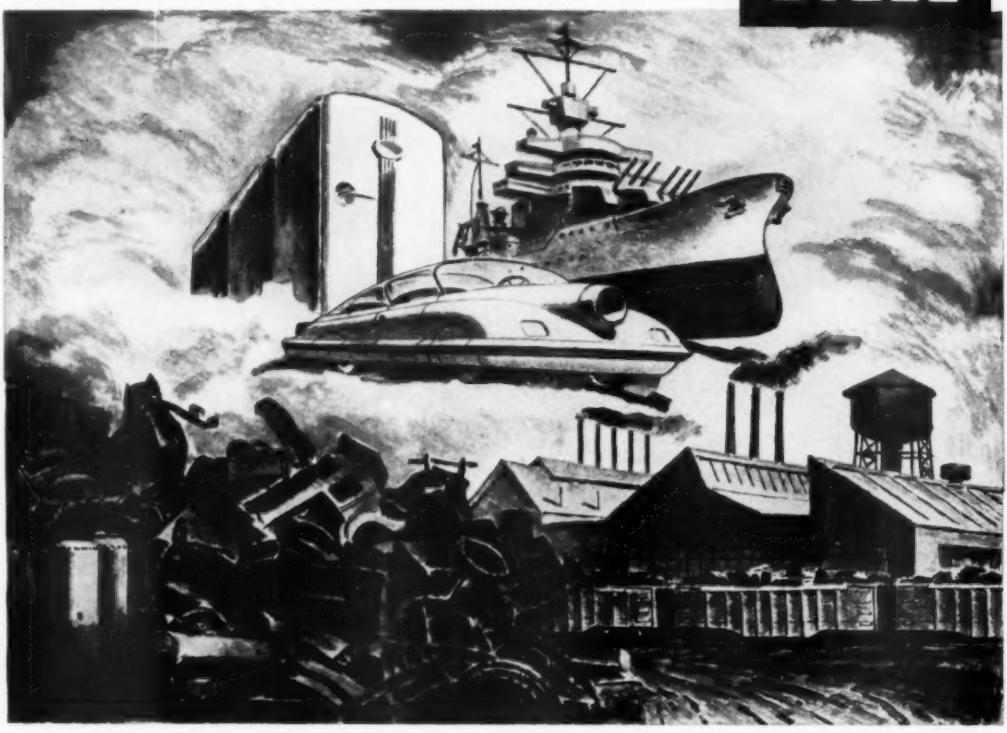
Name_____

Address_____

City_____ Zone____ State_____

LET'S BUILD THOSE
CRUISERS • CARS • REFRIGERATORS
HIDING IN YOUR OPERATION!

J&L STEEL



How much scrap is wasting away in your Plant?

Yes . . . hiding . . . gathering dust . . . rusting away! Whatever your business, you probably have more scrap iron and steel laying around your plant or operation than you imagine. Today, this scrap is one of America's most precious raw materials. It is needed urgently —every single ton saves vital ore. Get *your* scrap in. *Maximum quotas of steel cannot be obtained without it.*

Check NOW. Look for obsolete iron and steel machinery . . . fixtures . . . chains . . . broken parts—any old metal that's just gathering dust. Get it all together, call your scrap dealer. He'll pay you for it and get it back into production. Do it right away.

SCRAP IS YOUR BUSINESS, TOO!

JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH 30, PA.

Cummins® Diesels do so many jobs-so much better

Shovels, cranes, industrial locomotives

Drilling rigs, centrifugal pumps, generator sets

Buses and on-highway trucks

...because they're custom-built to fit the job

Earthmovers, logging yarders and loaders

Off-highway trucks, crawler tractors

Work boats, pleasure craft

Lightweight, high-speed Diesels (50-550 hp) for these and many other uses

---

...because they're

BUILT NOT ONCE BUT TWICE

Rugged, lightweight, high-speed Cummins Diesels are at work everywhere. Each engine is built *twice*. It's assembled, run-in tested, disassembled and inspected, then reassembled and tested again. This extra care in building, plus Cummins exclusive fuel system and an efficient and expanding service and parts organization, means minimum "down time", more power and profits for the user. See your Cummins dealer.

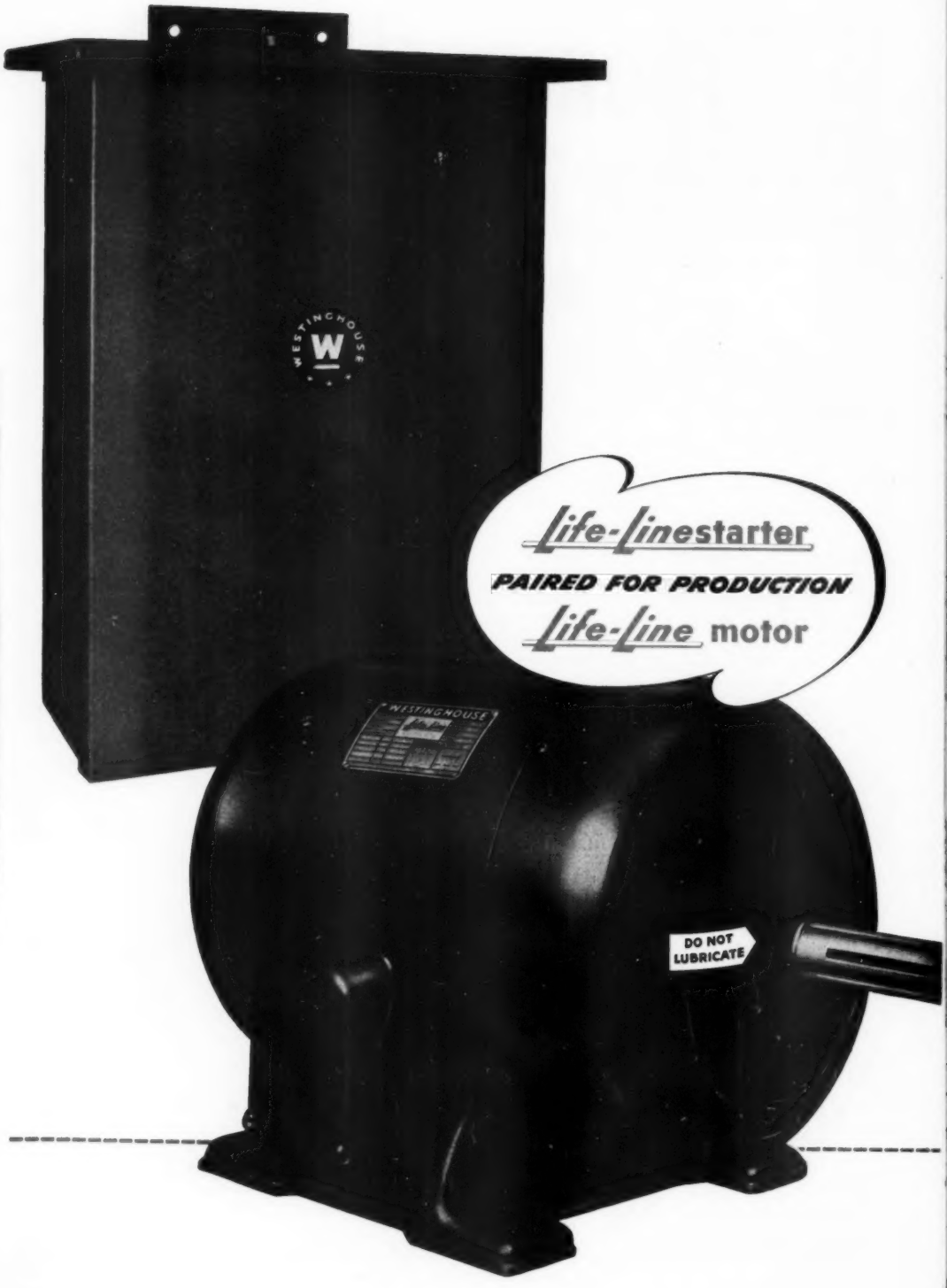
CUMMINS Diesel

TRADEMARK REG. U. S. PAT. OFF.

Diesel power by CUMMINS

CUMMINS ENGINE COMPANY, INC., COLUMBUS, INDIANA

Export: Cummins Diesel Export Corporation • Columbus, Indiana, U.S.A. • Cable: Cumdiex


WESTINGHOUSE
W
Life-Linestarter
PAIRED FOR PRODUCTION
Life-Line motor
WESTINGHOUSE
DO NOT
LUBRICATE

Stay On-Stream longer with this protected pair

Here is a motor and control team especially built for outdoor oil well pumping service. Notice how each is extra protected to guard against rain, snow, sleet.

Look at the outer hood of the motor that gives extra protection against weather. And the controls—AB Circuit Breaker and Life-Linestarter®—are combined in one weatherproof enclosure suitable for pole mounting.

Protection against weather is part of the story. What's more, these two have the stamina to stand up to continuous pumping duty with a minimum of attention.

The Life-Linestarter is years ahead in principle of operation. Only one moving element. Nothing to stick or jam. Vibration, jars or accidental blows cannot cause false operation. Where cycle pumping is required, the built-in time switch handles the "ON" and "OFF" operations automatically. Releases pumper from making periodic trips to the well for manual switching.

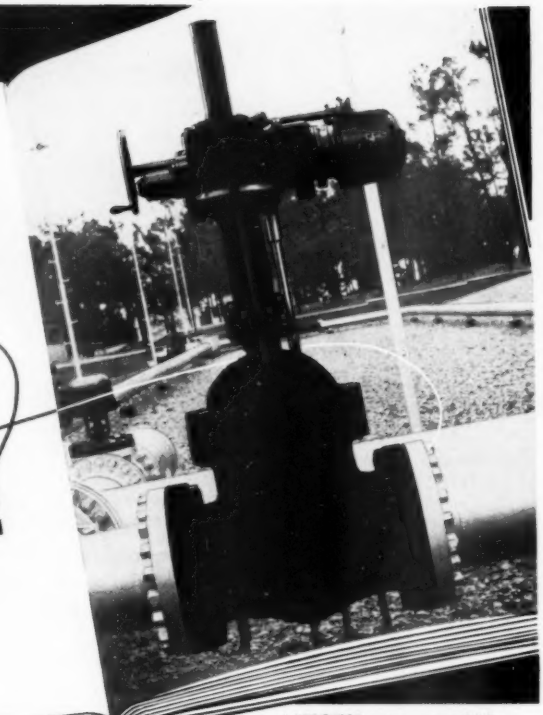
You can't get a more rugged motor than the Life-Line. Its steel frame, brackets and feet can take severe shock duty imposed by pumping service. Pre-lubricated bearings need no lubrication . . . eliminate outages due to faulty lubrication.

If it's dependability you want, check these two. They're paired for performance. Ask your Westinghouse representative for copies of "Life-Line Motor Book", B-3842 and "Tomorrow's Starter Today", B-4677, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-21641

YOU CAN BE SURE.. IF IT'S
Westinghouse
Life-Line
MOTORS and CONTROLS

KEROTEST

Full Opening PIPE LINE VALVES



A KEROTEST motor operated full opening 18" Pipe Line Valve carrying 1000 p.s.i. pressure.

Easy Clearance FOR SCRAPERS

FULL ROUND OPENING—OVERSIZE SEAT RINGS!

23
PIPE LINE COMPANIES
are now using Kerotest Valves —among them some of the world's outstanding operators whose engineering ability has marked them as leaders in the field.

KEROTEST

- ✓ KEROTEST Pipe Line Valve operating features and capacities are designed for the heavy duty requirements of modern pipeliners.
- ✓ KEROTEST Pipe Line Valves have been operating for years on gas lines, crude, gasoline and LPG lines —*proved* in service.
- ✓ KEROTEST Pipe Line Valves are in operation today on pipe lines throughout the world.
- ✓ FULL RANGE of sizes available with handwheel, gear, motor or cylinder operation.

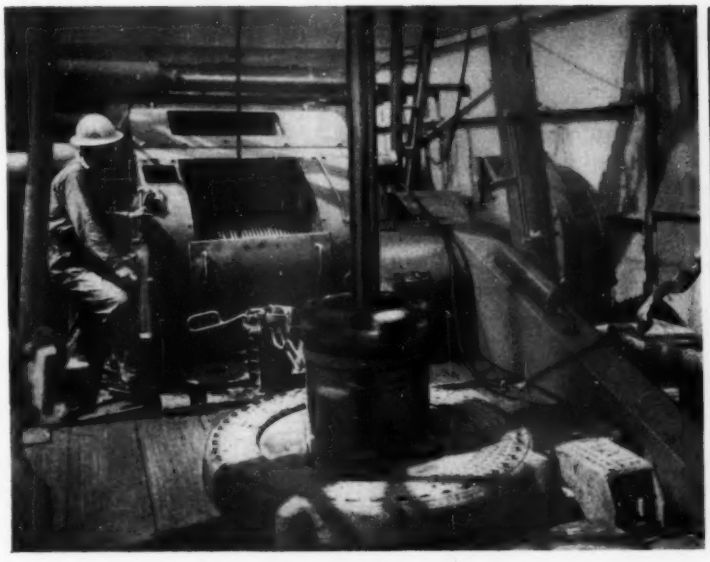
KEROTEST

MANUFACTURING COMPANY

PITTSBURGH 22, PA.

New York • Chicago • Charleston, W. Va. • Tulsa • Odessa • Houston
Los Angeles • St. Louis • Toledo • Richmond • Baltimore

WIRE ROPE



ROEBLING ALL-PURPOSE SLINGS with the Tapered Sleeve Splice come to you ready for the job. They cost less than tucked splices . . . have the full strength of the rope. Send for the full story.

In the oil fields Roebling "Blue Center" Preformed is tops for service and savings

"BLUE CENTER" STEEL wire rope is an exclusive Roebling development. It has to pass the most stringent tests for strength, fatigue and abrasion resistance . . . gives rope the extra long life that spells important economies. Besides, Roebling Preforming assures you top performance on the job. "Blue Center" Preformed is easy to handle . . . has better spooling qualities . . . reduces vibration and whipping.

Roebling makes a complete line of wire rope . . . makes the right grade, and construction for every installation. Have your Roebling Field Man help choose the *right* rope for your equipment. Get his advice on the correct use and maintenance of wire rope. It is based on performance records on thousands of installations. John A. Roebling's Sons Company, Trenton 2, New Jersey.

ROEBLING

DISTRIBUTED BY THE NATIONAL SUPPLY COMPANY
REPUBLIC SUPPLY COMPANY

15 Years...on the same job

dependable, economical Electric Power

This central power unit on a Major Oil Company's lease in Glasscock County, Texas, has been operating successfully for 15 years on Dependable, Efficient Purchased Electric Power. This is another case history of the economy and performance you'll receive from Purchased Electric Power. Investigate today. Contact your nearest Power Company Engineer. He'll explain the advantages and savings you get when you switch to Low Cost Purchased Electric Power.

Petroleum Electric Power Association

ORGANIZED IN THE INTEREST OF GREATER SERVICE TO THE PETROLEUM INDUSTRY

CALL YOUR NEAREST ELECTRIC SERVICE COMPANY FOR MORE FACTS

OR ADDRESS YOUR REQUEST TO P. O. BOX 2771, DALLAS, TEXAS

Built FOR better LIVING

That is what the carefully patterned mazes of refinery equipment, produced by Sun for many leading refineries, mean for America.

These towering refineries mean light, heat, comfort and power for the nation's homes and industries . . . fuel for transportation by ship, rail and motor car . . . mobility for our naval and military forces.

They must not fail . . . *they will not fail!* Into their making have gone Sun's engineering skill and craftsmanship, time-tested in wide fields of mechanical production . . . in refinery and chemical plant equipment, in shipbuilding, in fabricated steel work, in the renowned and powerful Sun-Doxford marine Diesel engines and other specialized machinery.

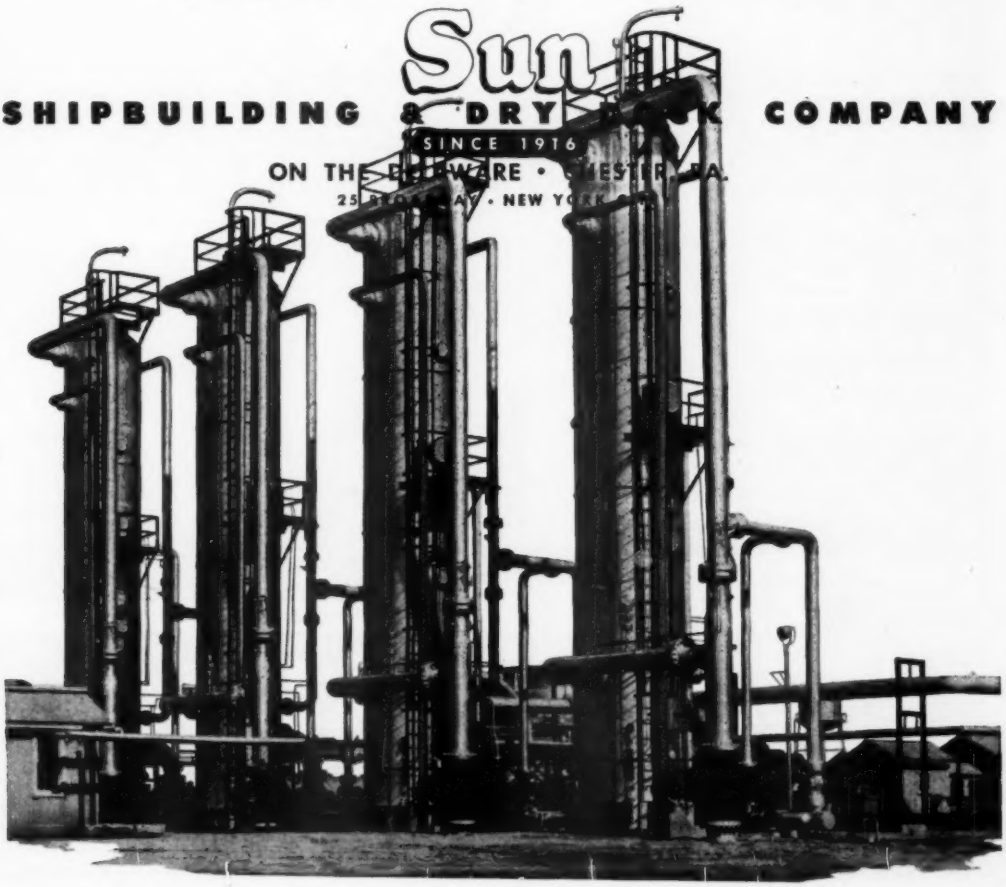
The more exacting the specification, the greater opportunity for Sun to maintain its engineering prestige.

Sun SHIPBUILDING & DRY [illegible] COMPANY

SINCE 1916

ON THE [illegible] • [illegible] PA.

25 [illegible] • NEW YO[illegible]



why ALCO AIRCOOLERS are specified for these Installations

There's no mystery about the preference for performance-proved ALCO Aircoolers. These efficient units are used everywhere by the oil industry to cool jacket-water, gas, engine lube oils, and to condense steam, vapors, etc. Users prefer them because they have five major advantages:

1. LOW COST—Goes way beyond first cost. ALCO standardized parts . . . broad heat-transfer experience . . . volume production . . . plus correctly engineered safety factors . . . insure *real* economies.

2. FLEXIBLE DESIGN—You can get either the radiator core or fintube type cooler from ALCO, powered by electricity, steam, gas or oil.

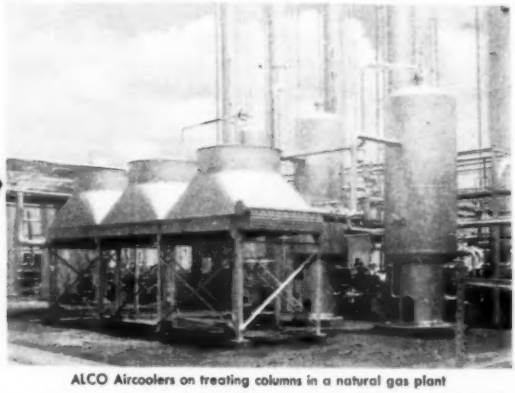
3. EFFICIENT PERFORMANCE—Induced draft design eliminates the chance of recycling hot air with a subsequent loss in heat transfer.

4. EASY MAINTENANCE—Fewer parts, easy accessibility and better wearing characteristics.

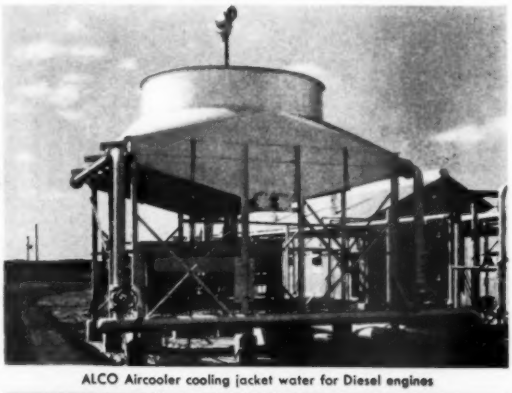
5. QUICK INSTALLATION—For fast field assembly, every part is marked and identified on assembly drawings so that no specialized labor is required.

Send now for free catalog, or call your nearest ALCO Sales Engineer at Beaumont, Chicago, Houston, Los Angeles, New York or Tulsa. Plants at Dunkirk, New York, and Beaumont, Texas.

ALCO Aircoolers in operation at cycling plant



ALCO Aircoolers on treating columns in a natural gas plant



ALCO Aircooler cooling jacket water for Diesel engines

ALCO

ALCO Products Division

AMERICAN LOCOMOTIVE COMPANY

In step with tomorrow—ALCO AIRCOOLERS, Heat Exchangers, Evaporators, Feedwater Heaters, Pressure Vessels, Pipe

New unit turns cable tool drill into rotary drill—relies on TIMKEN® bearings

CABLE tool drilling machines can now be converted for rotary drilling with the revolutionary Stardrill rotary attachment. The new unit, consisting of a rotary driving head, transmission, swivel, traveling block and kelly all unitized in a framework, is easily attached to and driven by the cable tool machine. Big advantage claimed for the new unit: Users are able to do both kinds of drilling without investing in two machines.

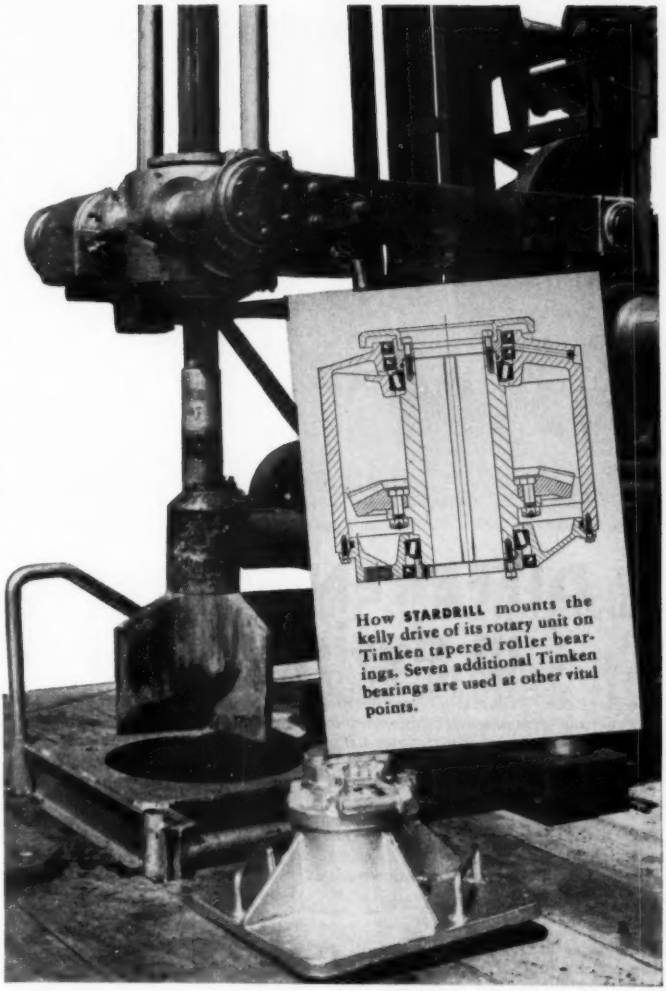
As a result of the long life and top performance which Timken® bearings have made possible in other models of Star drills, the Star Drilling Machine Company specified Timken bearings for their new rotary unit. They are used in the block hoisting sheave, block swivel eye, rotary swivel, transmission pinion shaft and rotary head.

Timken bearings carry radial and thrust loads in any combination due to tapered construction. Shafts, gears and sheaves are held in proper alignment, reducing wear. Line contact between rollers and races gives extra load-carrying capacity.

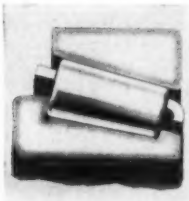
The true rolling motion and incredibly smooth surface finish of Timken bearings practically eliminate friction. Lubrication time and costs are minimized because Timken bearings keep housing and shaft concentric, make closures more effective.

No other bearing can offer all the advantages of a Timken bearing. Look for the trade-mark "Timken" on every bearing you use. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



How **STARDRILL** mounts the kelly drive of its rotary unit on Timken tapered roller bearings. Seven additional Timken bearings are used at other vital points.



GREATER LOAD AREA

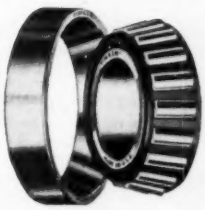
Because the load is carried on the *line* of contact between rollers and races, Timken bearings carry greater loads, hold shafts in line, wear longer.

The Timken Roller Bearing Company is the acknowledged leader in: 1. advanced design; 2. precision manufacturing; 3. rigid quality control; 4. special analysis steels.

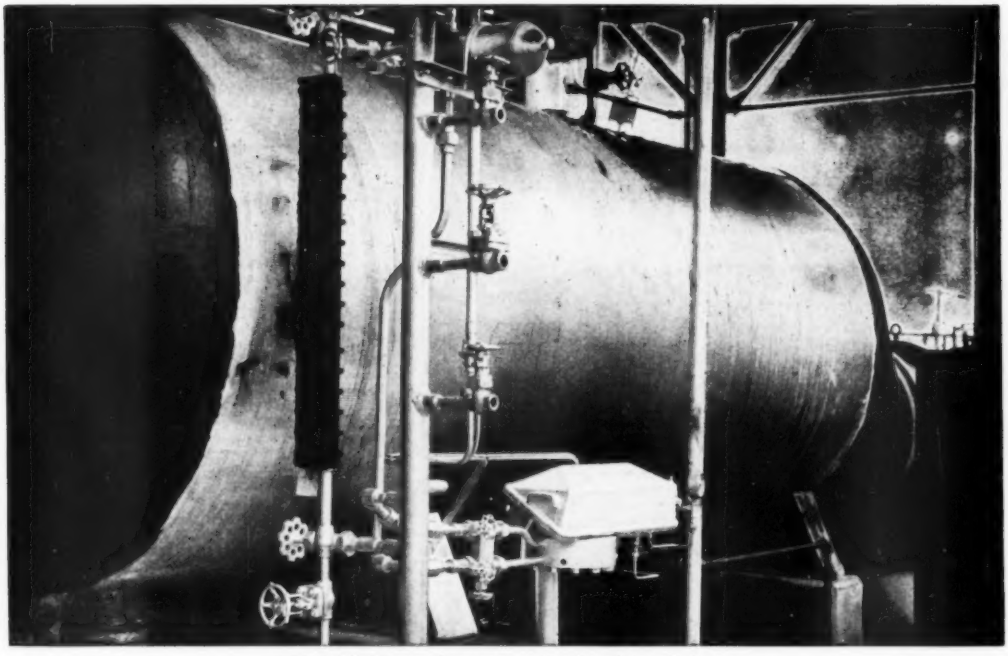
TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER ⊂⊃ THE TIMKEN TAPERED ROLLER ⊂⊃ BEARING TAKES RADIAL ◫ AND THRUST →◫← LOADS OR ANY COMBINATION →◫←



Republic Transmitter measuring level in reboiler

DIFFERENT . . . in design and performance

The Republic Pneumatic Transmitter is a device for converting process variables, such as flow, level, pressure or liquid density, into air pressures. These air pressures are a direct measure of the process variables or can be used as the measuring impulse for the actuation of an automatic controller.

The force-balance method of measurement, as employed by the Republic Pneumatic Transmitter, offers many inherent advantages such as:

AMBIENT TEMPERATURE — The effect of ambient temperature variations on the accuracy of a Republic Transmitter is negligible. Since all parts are equally affected by temperature changes, force and leverage relationships are not disturbed and accuracy is unimpaired.

AIR SUPPLY PRESSURE—The effects of changes in air supply pressure is so small that it is guaranteed negligible.

LINE PRESSURE — The effect of variations in line pressure has been completely eliminated.

SENSITIVITY—Due to the negligible motions required for complete operation of all parts for full scale changes, no appreciable hysteresis results from reversal of direction of measurement change. The hysteresis loop is so small that it is undetectable by ordinary means, being less than 1/20 of 1%.

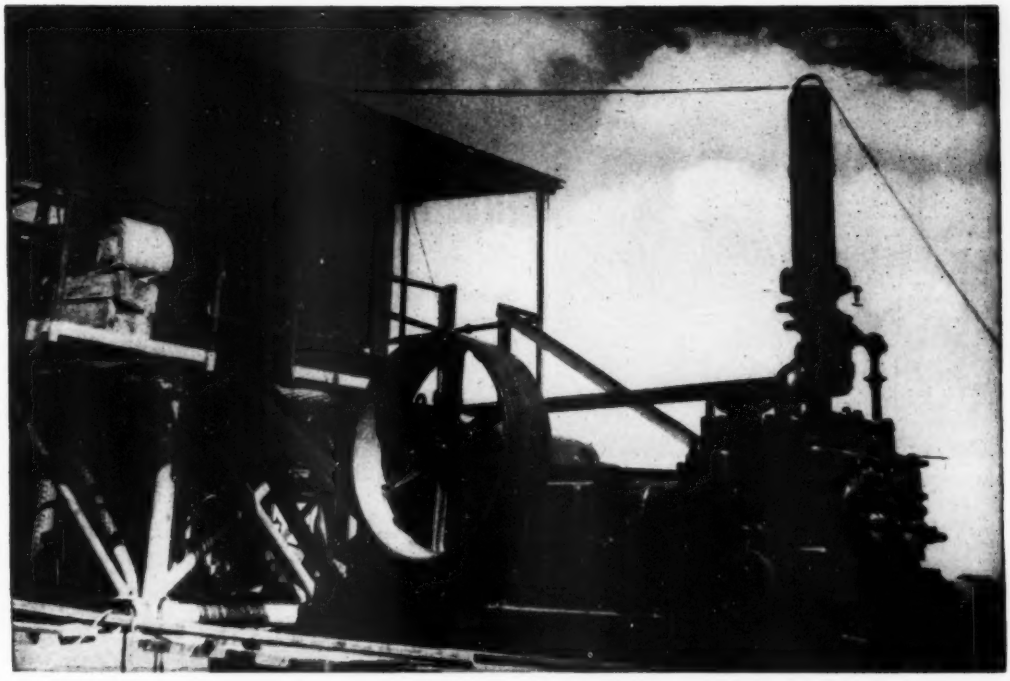
ACCURACY — The accuracy of the Republic force-balance method of measurement is higher than can be consistently secured and maintained with any other method. Transmitting pressure vs. measured force is guaranteed within ½ of 1% of meter range.

In addition to these five important features, the Republic Pneumatic Transmitter is extremely flexible in application, easy to service and of rugged construction.

If you have a flow, level, pressure or liquid density metering or control problem may we suggest that you investigate the Republic Pneumatic Transmitter? Data Book No. 1002, which contains complete details of this instrument, will be mailed to you upon request. Write for it today!

REPUBLIC FLOW METERS CO.

2240 Diversey Parkway, Chicago 47, Illinois



This is the Drive the Production Men Wanted ... They Got It ... Now Everybody Prefers It

It was the demand of the oil production men for a sheave like this that gave the QD sheave its start.

Now it's the most widely used hub-and-rim combination . . . in *all* industries.

Why does the Worthington QD satisfy the man in the oil fields?

Because it's *stronger*. Each size is designed for the load it has to carry—rather than proportioned for various sizes from one standard design.

Because it's *easier*. Easy to *get on*—split hub is clamped to shaft, heavier taper-bored rim slides easily over tapered hub. Easy to *get off*—long pull-up bolts are used as jack screws to remove the rim; hub stays put, no realignment problem.

Because it's always *tight* on the shaft. The friction cone grip of rim on hub makes a positive press fit on the shaft.

And because it's quickly *available*. Local distributor stocks all over the Southwest and other oil field areas, are backed by factory stocks in Los Angeles, Fort Worth, Houston, Tulsa, and New Orleans.

Standardize on Worthington Multi-V-Drive, with the original tapered cone grip sheave. Worthington Pump and Machinery Corp., Multi-V-Drive Sales Division, Buffalo, N. Y.

MV.1.10

QD

*Trade Mark

Most widely used hub-and-rim sheave

WORTHINGTON

THE GOOD RIGHT HAND OF INDUSTRY

POWER TRANSMISSION: sheaves, V-belts, variable speed drives

PUMPS: centrifugal, power rotary, steam

AIR COMPRESSORS: water-cooled, air-cooled

"What happens when Standard men go into the armed forces?"

One question on many people's minds these days *is how military service may affect themselves or people they know...their jobs, their family security. People ask us, of course, about what happens to employees of Standard Oil Company of California.*

The answer shows what a big company can do. Standard Oilers come through this trying period in better financial shape than you might expect:

Let's take for example Bill, an average young Standard Oiler. As a mechanic with the Company, he makes $368 a month. He has Company-paid life insurance worth $4,420, a pension plan paid partly by himself, other benefits.

Now suppose Bill is called into the armed forces. One of the tough problems he might face is a lower income for his family. But because he qualifies as to dependents and length of service, he'll be helped by a plan Standard has for him.

When Bill leaves for active duty, he's given an extra month's salary. Then Standard sends his family a monthly check to make up the difference between his military pay and his Company pay—an amount up to half his regular salary.

Moreover, Bill's Company life insurance remains in force—still paid for entirely by Standard. And the pension plan, which Bill paid for in part while he was working, continues to grow—but now Standard of California pays it all.

When Bill comes back from military service his job is waiting . . . his benefits intact. Standard, having big *economic* resources, can and does act to preserve the *human* resources of the nation . . . people like himself and his family.

This is Standard's "G.I. Policy" for qualified employees called into the Armed Forces. We believe it helps strengthen Company morale and that of the nation, too—another way Standard serves best by being a big company.

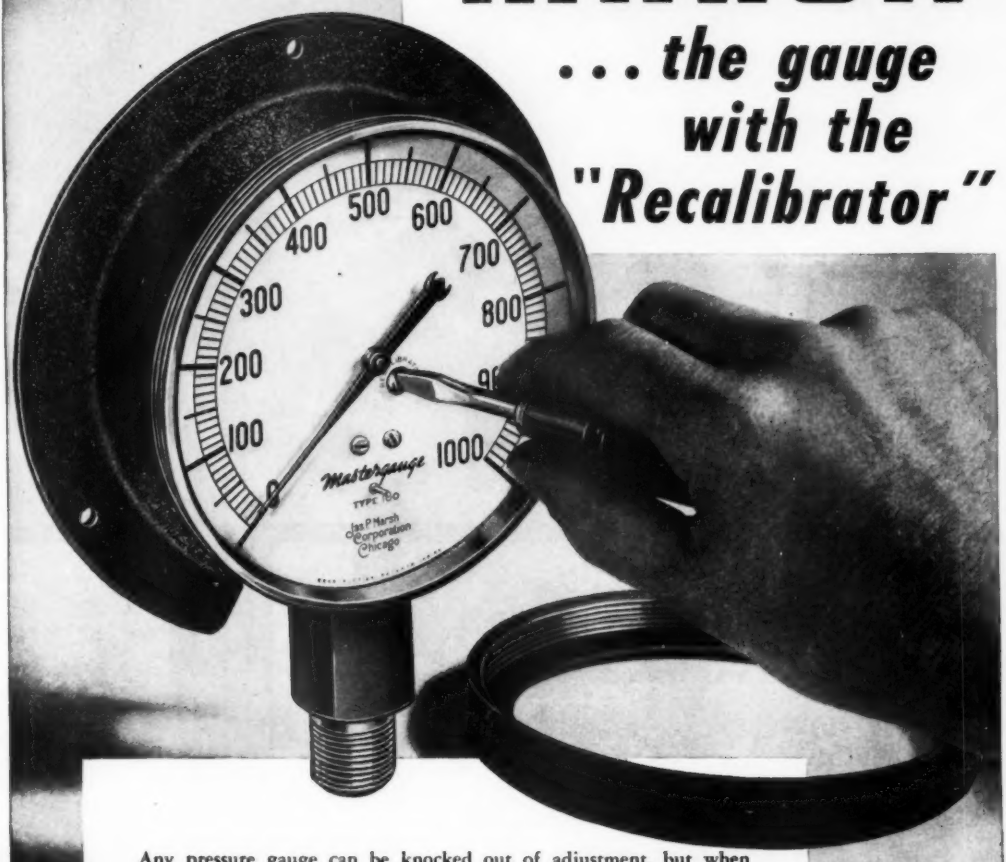
I'd Like to Know . . . Many people write to Standard asking pertinent questions about the Company. We answer all letters individually, but some points seem of general interest. We take this way of discussing them for every one. If you have a question, we urge you to write in care of: "I'd Like to Know," 225 Bush Street, San Francisco 20, California.

STANDARD OIL COMPANY OF CALIFORNIA

• plans ahead to serve you better

MARSH

. . . the gauge with the "Recalibrator"



Any pressure gauge can be knocked out of adjustment, but when it's a Marsh Gauge you can quickly correct it with the twist of the "Recalibrator" screw.

This is not only the handiest way to correct a gauge; it is also the best way. Conventional methods of adjustment simply compensate for the error. The "Recalibrator" corrects the relationship between the movement and the bourdon tube—actually *does re-calibrate* the gauge.

MARSH INSTRUMENT CO. Affiliate of James P. Marsh Corp. Dept. L. SKOKIE, ILL.

Export Dept.: 155 E. 44th St., New York 17, N. Y.

The Marsh line includes gauges especially designed for blenders, boilers, burners, capping, Christmas trees, columns, heaters, hydrogen units, instrument panels, pumps, Reid vapor bombs, scrubbers, separaters, mud pumps, stills, towers and other applications including oxygen and welding gauges. Ask on your letterhead for new catalog just off the press.

Jarring Jerry

The right jar
for the job at hand

THE JOHNSTON-SUTLIFF HYDRAULIC JAR

A Jar that hits any desired blow, at any time, to meet any condition—without pulling out of the hole.

Write For Descriptive Literature!

JOHNSTON

SHOOT TEST

M. O. JOHNSTON OIL FIELD SERVICE CORPORATION
3035 Andrita Street — Los Angeles 65, California
"Servicing California & Rocky Mountains"

M. O. JOHNSTON OIL FIELD EXPORT CORPORATION
3035 Andrita Street — Los Angeles 65, California
"Exclusive Export Sales"

Remember—

the trade marks "tt" and "TUBE-TURN" are applicable only to products of TUBE TURNS, INC.

It's a neat job...and it's stronger

Write Dept. J-11 for free booklet, "Allowable Working Pressures".

● Welded piping systems are streamlined. They save space, are easier to insulate and are permanently leakproof.

For a complicated connection like this, use of the TUBE-TURN Welding Cross also means extra strength. This welding cross is made from the same seamless tubing and by the same process as TUBE-TURN Welding Tees. Bursting pressures obtained in tests of representative tees and crosses have averaged more than 25% higher than required by standard codes. This gives you extra quality at no extra cost.

Welding your piping with TUBE-TURN Welding Fittings means a neater design and stronger construction. Get in touch with your nearby TUBE TURNS' Distributor. There's one in every principal city.

Be sure you see the double "tt"

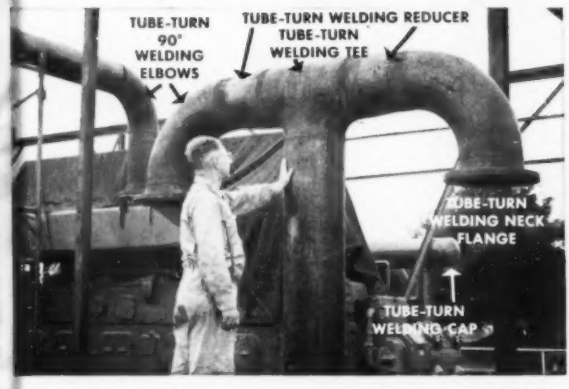
TUBE TURNS, INC. LOUISVILLE 1, KENTUCKY

DISTRICT OFFICES: New York · Philadelphia · Pittsburgh · Chicago · Houston · Tulsa · San Francisco · Los Angeles
TUBE TURNS OF CANADA LIMITED, CHATHAM, ONTARIO... A wholly owned subsidiary of TUBE TURNS, INC.

Complex piping at Angelica calls for TUBE-TURN Welding Fittings

Connections to this underground header show how the wide range of TUBE-TURN Welding Fittings simplifies fabrication work in construction of a new booster station for the Penn-York Natural Gas Corporation.

The Angelica Station supplies gas originating in Texas and Louisiana to the Buffalo, New York area. In expanding the station with two 660-hp compressors, Penn-York specified welded piping with TUBE-TURN Welding Fittings and Flanges throughout.



Air intake for one of the new compressor engines is through a 14" line. This line is divided into two 12" lines, to which air cleaners will be attached. Note how TUBE-TURN Welding Tee, Welding Reducers, Welding Elbows, and Welding Neck Flanges permit simple construction from standard parts.

Exhaust for compressor mufflers is fabricated on ground, later raised in position. Welding the TUBE-TURN Welding Neck Flange to the 14" pipe presents no problems. Dimensional accuracy assures perfect fit and a speedy fabricating job.

Lines to gas cleaners are all welded, with TUBE-TURN Welding Fittings. Original capacity of this station was 750 hp, for output pressure of 350-400 psi. Addition will give total capacity of 2070 hp, discharge pressure 490 psi.

TUBE TURNS, INC., Dept. J-11
224 East Broadway, Louisville 1, Kentucky

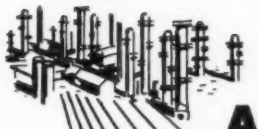
Your Name .....
Position .....
Company .....
Nature of Business .....
Address .....
City ..... *State* .....

DISTRICT OFFICES

New York	Houston
Philadelphia	Tulsa
Pittsburgh	San Francisco
Chicago	Los Angeles

Be sure you see the double "tt"

TUBE TURNS, INC.
LOUISVILLE 1, KENTUCKY



A GRAVER EXCLUSIVE

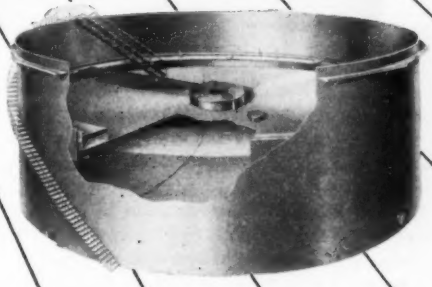
GRAVER CENTER-WEIGHTED FLOATING ROOF TANK

A PROVED DESIGN FOR 3-WAY ECONOMY

- **No Corrosion — No Filling Losses**
- **Takes Less Steel To Build**
- **Lower Maintenance Cost**

Built for the storage of crudes or finished petroleum products, the patented design of the Graver Center-Weighted Floating Roof combines the stability, the vapor-savings and the corrosion resistance of the Double Deck Floating Roof with the more economical aspects of the conventional pan-type roof.

Announced in November, 1950, after several years on the drawing board and a full year of exhaustive tests . . . this new design already has been widely accepted by the petroleum industry. New tanks with Graver's single deck floating roofs have been completed in six states with similar installations scheduled for nine more, covering all sections of the nation. Capacities of the tanks built and on order range from 20,000 to 150,000 bbls.; diameters from 60' to 150'.



GRAVER TANK & MFG. CO., INC.

EAST CHICAGO, INDIANA

NEW YORK · CHICAGO · PHILADELPHIA · WASHINGTON
DETROIT · CINCINNATI · CATASAUQUA, PA.
HOUSTON · SAND SPRINGS, OKLA.

In Over Half
a Hundred
Oil Fields

Lane-Wells Radioactivity Well-Logging

QUANTITATIVE INTERPRETATION

means

TO OPERATORS

If you could know, with reasonable accuracy, how much oil you could expect to take from your new producer—that would be as good as money in the bank, wouldn't it? Well, Lane-Wells Radioactivity Well Logging is now doing just that for operators in more than fifty fields.

Improved techniques of Radioactivity Well Logging now permit quantitative interpretation in many areas, making possible an estimate of the amount of fluid-filled porosity of certain oil-bearing formations. This estimate is sufficiently accurate for all commercial purposes.

While this service is, at present, limited to certain formations, it is being extended rapidly to other fields where the formation responses allow such quantitative interpretation.

Tomorrow's Tools - Today!

Ask Your Lane-Wells Man!

LANE WELLS
Radioactivity
WELL LOGGING

General Offices, Export Office and Plant • 5610 So. Soto St. Los Angeles 58, California

Los Angeles • Houston • Oklahoma City
Lane-Wells Canadian Co. in Canada
Petro-Tech Service Co. in Venezuela

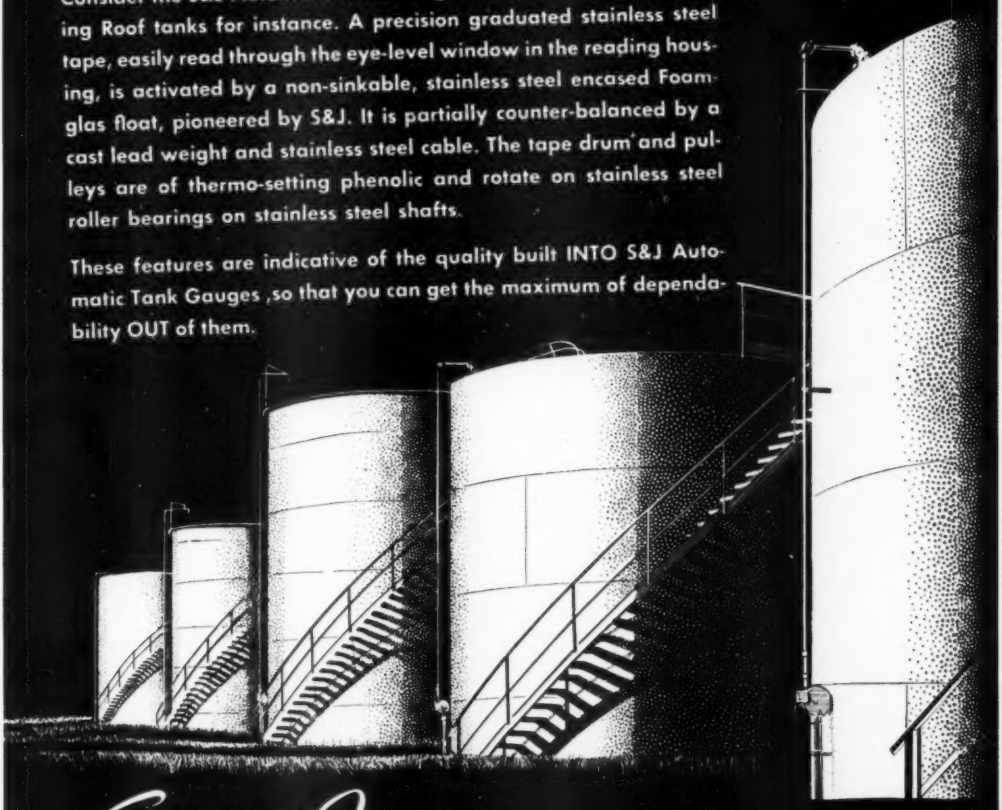
AR-410

The added PLUS

SHAND & JURS Automatic Tank Gauges not only provide maximum tank gauging accuracy, increase safety and cut gauging time . . . they also deliver an equally important PLUS! This plus feature is embodied in the superior QUALITY of their design and construction, assuring continuous gauging accuracy and longer, dependable operation.

Consider the S&J Automatic Tank Gauges on these Cone and Floating Roof tanks for instance. A precision graduated stainless steel tape, easily read through the eye-level window in the reading housing, is activated by a non-sinkable, stainless steel encased Foamglas float, pioneered by S&J. It is partially counter-balanced by a cast lead weight and stainless steel cable. The tape drum and pulleys are of thermo-setting phenolic and rotate on stainless steel roller bearings on stainless steel shafts.

These features are indicative of the quality built INTO S&J Automatic Tank Gauges ,so that you can get the maximum of dependability OUT of them.



Shand and Jurs Co. 8TH AND CARLTON STREETS : BERKELEY : CALIFORNIA

NEW YORK 295 Madison Ave. CHICAGO 10409 S. Western Ave. HOUSTON 827 M & M Bldg. TULSA 310 Thompson Bldg. LOS ANGELES 714 W. Olympic Blvd. SEATTLE 3000 Western Ave.

MONTREAL, QUE., 360 Notre Dame St. West VANCOUVER, B. C., 550 Beatty St. FORT ERIE, ONT. DARLINGTON, ENG. CARACAS, VEN.

New Boiler Code Rulings permit Higher Temperatures with INCO Nickel Alloys

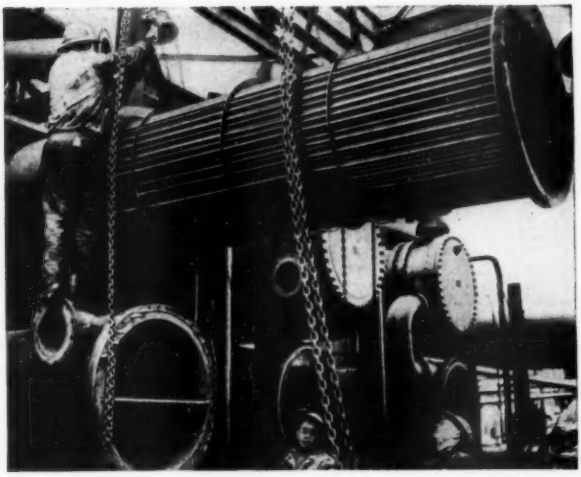
New interpretations of the A.S.M.E. Boiler Code have raised temperature limits on INCO Nickel Alloys used in the construction of unfired pressure vessels.

Also, in addition to annealed Monel, it is now permissible to use stress-relieved Monel, which has substantially higher mechanical properties.

These two modifications of the code mean that it is now possible to build stronger and lighter heat exchangers for higher temperature service, *that are insurable because they are built to code requirements.*

But this modified code applies only to physical properties. To overcome corrosion troubles, users must assume the responsibility for choosing the correct materials.

A glance at the table will show how some users have been able to get greatly increased equipment life by the proper choice of heat exchanger metals...



A cleaned exchanger tube bundle being replaced in its shell. "Spring-cleaning" like this prevents failures in service and insures efficient heat exchange. *Photo courtesy The M. W. Kellogg Co., New York, N. Y.*

Right now, INCO Nickel Alloys are being diverted more and more to defense production. This means you may have to wait to get Monel. But it doesn't mean you have to wait to find out whether our Corrosion Engineering Service can help you. Simply write – and outline your problem.

And at the same time, ask for a free copy of the new "Boiler Code Interpretations Involving Nickel, Monel, Inconel." It lists the new stress and temperature limits for the INCO Nickel Alloys.

OPERATING HISTORIES OF MONEL HEAT EXCHANGER TUBING

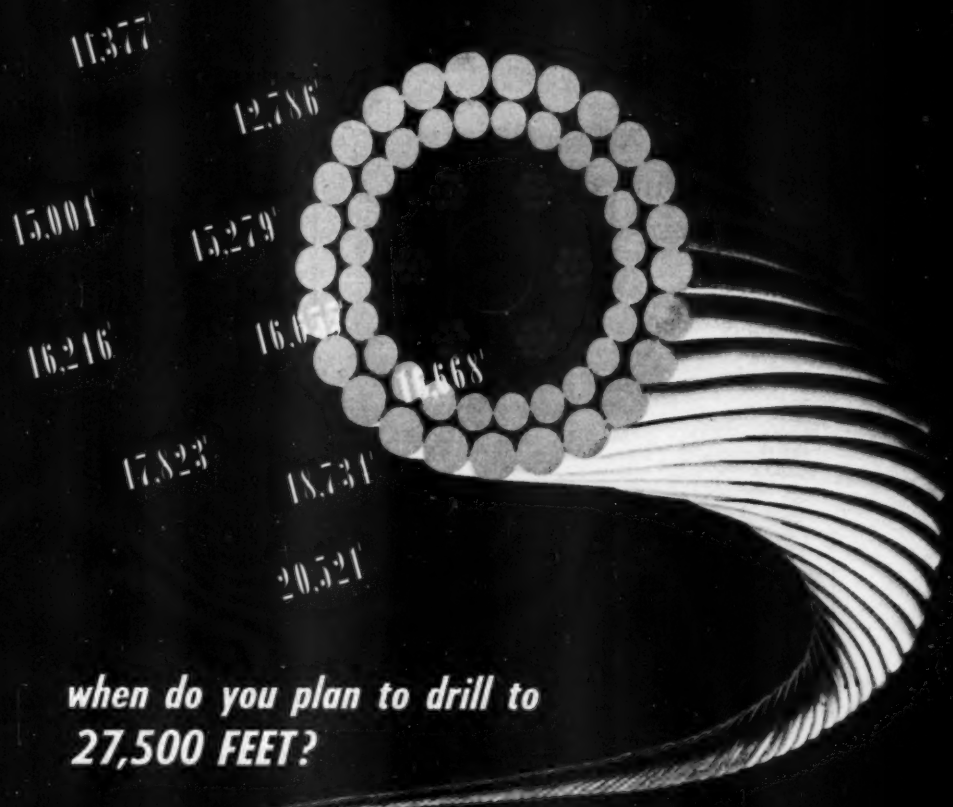
Case No.	Products Handled		Highest Temperature	Service Life		
	Inside tubes	Outside tubes		Previous Material	Monel tubes	Condition of Monel at last inspection
1	Steam	Caustic	350	2-8 weeks	17 months	Good—still in service
2	Foul Caustic	Steam	300	5 months	25 months	No evidence of corrosion
3	Heavy recycle	Straight run gasoline distillate	550	6665 hours	38,535 hours	Renewed 24 tubes after 22,000 hours—3 tubes plugged at 38,535 hours. Remainder OK.
4	Caustic soda and sodium chloride	Steam	240	10 months	80 months	Good—15 tubes replaced—weld failures
5	Crude oil	Gasoline vapor	300	6-8 months	48-60 months	No inspection

Service information on heat exchangers closely similar to yours is probably not in this table. However, help is available from INCO's Corrosion Engineering Service. From their thousands of data sheets showing corrosion rates in a wide variety of media, it is likely that an answer to your specific problem can be found.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York 5, N. Y.

LEADER IN SERVICE
NICKEL INCO ALLOYS

Monel® • "R"® Monel
"K"® Monel • "KR"® Monel • "S"® Monel
Nickel • Low Carbon Nickel • Duranickel®
Inconel® • Inconel "X"®



when do you plan to drill to 27,500 FEET?

Schlumberger now has in service a 24,000 foot cable — the longest electrical logging cable ever made available to the oil industry.

Schlumberger is already designing equipment for safe and reliable logging at 27,500 feet.

Schlumberger progress is oil progress.

SCHLUMBERGER

SCHLUMBERGER WELL SURVEYING CORPORATION

Preferred power for portable conveyors, too — the world's most widely used single-cylinder 4-cycle, air-cooled gasoline engines on machines and tools for industry, construction, railroads, and on appliances and equipment for farm and home.

THERE is a Briggs & Stratton engine service organization, factory trained and supervised, near you — with a stock of genuine Briggs & Stratton parts for all models. The Briggs & Stratton service organization network is the largest of its kind in the world. Briggs & Stratton Corporation, Milwaukee 1, Wis., U. S. A.

In the automotive field Briggs & Stratton is the recognized leader and world's largest producer of locks, keys and related equipment.

They Say—

Winter Supply Estimate

"Based on today's conditions and given normal weather for the next 6 months, we believe the domestic petroleum industry will come through with low inventories of civilian products—but not any lower than last year's. Product-wise we are watching the residual fuel oil position most carefully. Certain areas have an over supply now, but the future doesn't look exactly rosy. Next in line for close scrutiny are the middle distillates (kerosine, heating oils, and diesels) even though certain areas are long on these products now. With a cold winter, we expect some residual shortage and some local—area distillate spot shortages of short duration."

Robert A. Hunter, assistant director, Supply and Transportation Division, Petroleum Administration for Defense, addressing Virginia Petroleum Jobbers Association, Roanoke.

Credit All Around

"The entire oil industry shares the credit for making the tremendous readjustments necessitated by the loss of both Iran's crude oil production and output of finished products.

"These shifts have taken place around the world and have occurred with much less trouble than was anticipated. They stand as a tribute to the flexibility of the oil industry. Tht results have been particularly satisfactory because they were achieved in the face of already accelerated demands occasioned by the Korean fighting."

R. G. Follis, chairman of the board, Standard Oil Co. of California, in third-quarter report.

Industry Bouquet

"Service provided by the oil industry for operating our cars and trucks, heating our homes and places of business, for cooking and refrigeration —is pretty much taken for granted.

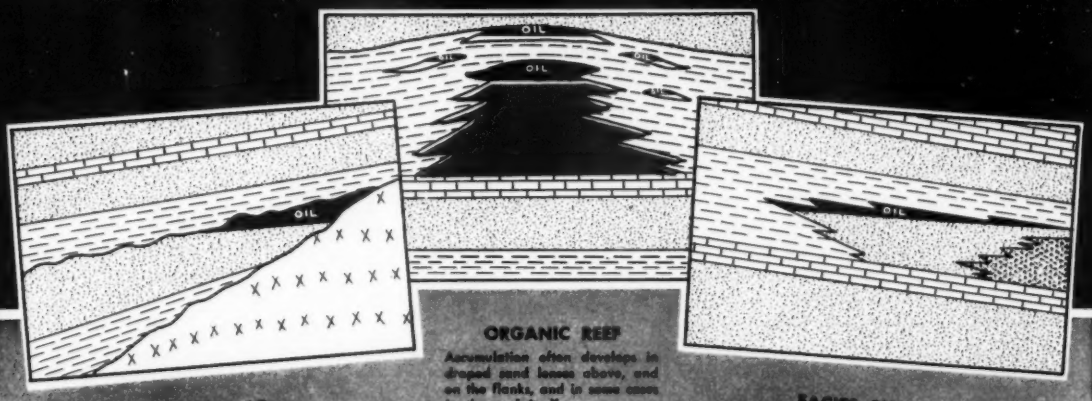
"Probably no other industry has gone so far in providing service for the users of its products.

"No other industry has done a better job of expanding since World War II to keep abreast of its civilian demands while handling additional consumption of the armed services with our undeclared war in Korea and increased military forces in Europe.

"In Russia, with its tremendous potential for oil production, if you were to get your share of gasoline for

Looking For STRAT-TRAPS?

HERE ARE 3 WELL-KNOWN STRATIGRAPHIC ACCUMULATIONS



OVERLAP

Accumulation may occur on the flanks of submerged land masses in zones of sand pinch—or wedge-out.

Example — EDISON FIELD, CALIFORNIA

ORGANIC REEF

Accumulation often develops in draped sand lenses above, and on the flanks, and in some cases in the reef itself.

Example — MARINE POOL, ILLINOIS

FACIES CHANGE

Subsequent silting may result in stratigraphic accumulation along the up-dip edge of the porous facies of a formation.

Example — CUT BANK FIELD, MONTANA

SSC

. . . . . RECOMMENDS THE FOLLOWING GENERAL APPROACH TO THE SEARCH FOR STRATIGRAPHIC TRAPS

1. Consolidate all geologic information with particular reference to changes in lithology in the prospect area.
2. Obtain all available velocity information.
3. Make detailed velocity tests in all prospect wells, placing special emphasis on the determination of *interval velocities.*
4. Make full use of the opportunities presented by the continuous profiling method to assemble mass seismograph data, placing special emphasis on interval times—(TRACE ANALYSIS).
5. Separate time differentials caused by structural deformation or tilting, from differentials attributable to changes in lithology—(MAKE RESIDUAL MAPS).
6. Extrapolate from geologic control using imaginative geophysics.

A series of two advertisements showing 6 well-known stratigraphic accumulations.

☐ AD No. 1
1. TRUNCATION
2. BURIED RIDGE
3. SOLUTION CAVITIES

☑ AD No. 2
4. OVERLAP
5. ORGANIC REEF
6. FACIES CHANGE

Seismograph Service Corporation takes great pleasure in offering its Bibliography of Stratigraphic Traps. Its distribution is another example of S.S.C.'s unexcelled service to the oil industry.

Seismograph Service Corporation

Bill Lewis, driller for Helmerich & Payne, Tulsa, Oklahoma, says:

"REED REAMERS *do a good job for us"*

"We use these REED Extra Short Bit Reamers directly above the drilling bit . . . . . and these REED Short Bit Reamers with smooth rollers above the drill collar."

and here is the reason why:

"This method tends to eliminate the buckling action of the drill collar column, pilots the bit for straight hole, and keeps the hole in better condition."

Bill Lewis

REED ROLLER BIT COMPANY

HOUSTON 1, TEXAS

NEW YORK LONDON BUENOS AIRES

Gulf Coast, Mid-Continent, Rocky Mountain and Canadian Distributor for Martin-Decker Products

your car from the annual Soviet production, it would be five (5) gallons per year. In the United States, the average annual consumption of gasoline per car is seven hundred (700) gallons.

"The oil industry is doing a tremendous job to make the democratic way of life a going concern."

The Journal, Anamosa, Ia.

Minor National Scandal

"The so-called tidelands oil dispute between the U. S. Government, on the one hand, and the states on the other, goes on. Because of it, millions of dollars worth of privately owned and financed drilling equipment lies idle along the Gulf Coast, and oil reserves which on some estimates run to 10 billion barrels—roughly equal to those of Persia—remain largely untapped.

"With the U. S. needing crude as never before, this dispute remains a minor national scandal. Less spectacular than the Persian case, it exhibits many of the same maddening characteristics—the initial urge of free enterprise to exploit and develop natural resources through high technology; the advent and clash of governmental forces; the buzzing of lawyers and of courts of law; and meanwhile plenty of Billingsgate.

". . . If it cannot solve the Iranian case, let Washington at least help clean up its own waterfront."

Baron's magazine.

Oil's House Is in Order

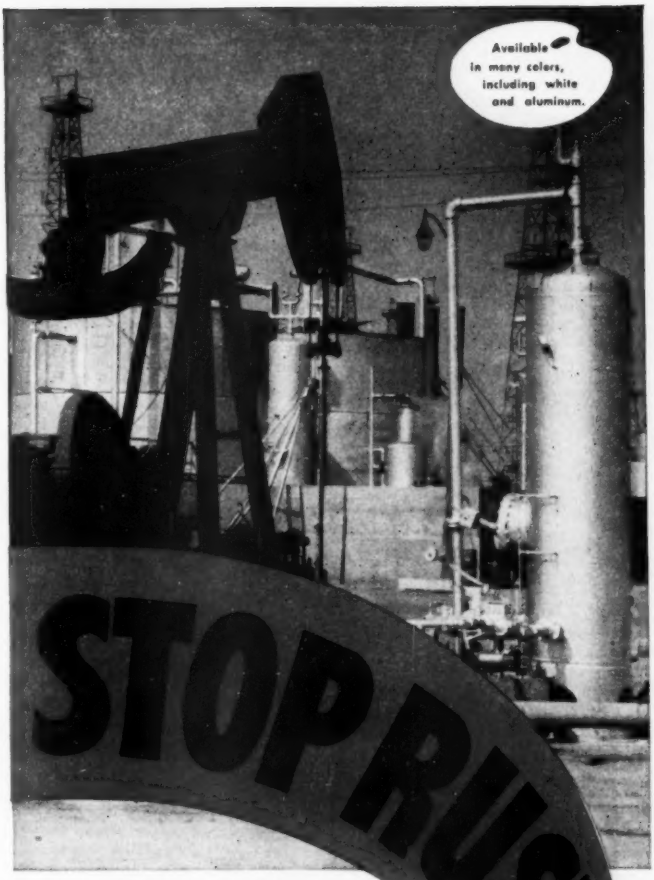
". . . In this hour of nation crisis, it is essential that our system of free enterprise be strengthened instead of weakened. That system has produced, and productivity is the foundation of prosperity and security.

"In a world filled with the prospect of upheaval, the oil industry has placed its house in order. It is ready to meet the challenge of any emergency that may come.

"We are ready to accept any sacrifices or dislocations that may be necessary in putting forth our best efforts to fulfill our obligations to our country, but we shall insist—yes, we will fight to the last ditch—that our industry shall maintain its fundamental freedom. We do not propose to surrender to socialism in any form.

"The oil industry in 92 years has performed a miracle in our American life. I dare say that it can achieve new records and greater miracles in the frontiers that lie ahead, which will dwarf its great achievements during the first half of our twentieth century.

"The destiny of the oil industry, as well as all other private industry, is so closely interwoven with our American system of free enterprise and individual initiative, that one follows the other as the night follows



Save Metal with

RUST-OLEUM

Silently, but ruthlessly (even as you are reading this) rust is gnawing away at your tanks, pumps, derricks, refining equipment, buildings, roofs, fences—every rustable metal—inside and outdoors.

To protect your investment—to keep every possible pound of new steel for the defense program—*adopt rust control with Rust-Oleum as an important part of your maintenance program.*

RUST-OLEUM stops rust. It can be applied *even* over rusted surfaces. It is not necessary to remove all the rust. Just use wire brush and sharp scraper to remove rust scale and loose rust.

RUST-OLEUM can be obtained promptly from Industrial Distributors' stocks in principal cities of the United States and Canada. Write on your company's letterhead for complete catalog and nearest source of supply.

RUST-OLEUM CORPORATION
2541 Oakton Street, Evanston, Illinois

• Stocked and Sold by Leading Industrial Distributors in All Principal Cities of the United States and Canada

PENFLEX FLEXIBLE TUBING CURES BREAKS IN VIBRATING STEAM LINES

One hundred pounds of steam fed to the spinning rollers of a paper laminating machine that was constantly moving a quarter of an inch. Rigid piping crystallized under the high frequency movement, broke and caused shutdowns. Then two years ago this large mid-west paper manufacturer called in Penflex.

The answer was one-half inch and three-quarter inch diameter braided Penflex-weld, equipped with Metseal couplings. This corrugated, all metal welded tubing serves the double purpose of giving flexibility and developing super-resistance against bursting, crushing or breaking. Non-burnable Penflexweld affords complete protection against high temperatures. Vibrating motion is isolated at its source.

Penflex engineers can help you solve flexible tubing application problems. In addition to corrugated welded tubing Penflex manufactures a complete line of four-wall, interlocked tubing from 1/8" I.D. and up . . . automatic barrel fillers, accessories and fittings. Write for the new Penflex catalog that gives the latest data on the application of flexible tubing for the greatest efficiency.

PENNSYLVANIA FLEXIBLE METALLIC TUBING CO., INC.
7213 POWERS LANE • PHILADELPHIA 42, PA.

Branch Sales Offices
Boston • New York • Chicago • Houston • Cleveland • Los Angeles

Penflex

HEART OF INDUSTRY'S LIFE LINES

the day. If we are to continue the amazing record of achievement for the good of all mankind, we must remain free. That freedom we must preserve at all peril."

Walter S. Hallanan, Pittsburgh, president of Plymouth Oil Co. and chairman of National Petroleum Council, before Fort Worth Oil Progress Week meeting.

CALENDAR

November

Petroleum Electric Power Association, twenty-third annual meeting, Shamrock Hotel, Houston, November 19-20.

Society of Exploration Geophysicists, regional meeting, Baker Hotel, Dallas, November 19-20.

Natural Gasoline Association of America, Panhandle-Plains regional meeting, Herring Hotel, Amarillo, Tex., November 20.

Mid-Continent Oil and Gas Association, annual board of directors meeting, Tulsa Club, Tulsa, November 20.

American Society of Mechanical Engineers, annual meeting, Chalfonte-Haddon Hall, Atlantic City, November 25-30.

Twenty-third Exposition of Chemical Industries, Grand Central Palace, New York City, November 26-December 1.

December

American Institute of Chemical Engineers, annual meeting, Chalfonte-Haddon Hall, Atlantic City, December 2-5.

Chemical Specialties Manufacturers Association, thirty-eighth annual meeting, Mayflower Hotel, Washington, D. C., December 3-4

Interstate Oil Compact Commission, annual meeting, Hotel Marion, Little Rock, Ark., December 11-12.

American Association for the Advancement of Science, annual meeting, Philadelphia, December 27-28.

1952 Meetings

January

Society of Automotive Engineers, annual meeting, Hotel Book-Cadillac, Detroit, January 14-18.

February

American Society for Testing Materials, Committee D-2 on petroleum products and lubricants, Shoreham Hotel, Washington, D. C., February 3-8.

Missouri Petroleum Association, annual convention and trade exhibit, Jefferson Hotel, St. Louis, February 4-6.

American Petroleum Institute, Division of Marketing, lubrication-committee meeting, Hotel Book-Cadillac, Detroit, February 18-19.

Wisconsin Petroleum Association, twenty-sixth annual convention and equipment show, Milwaukee Auditorium, Milwaukee, February 26-27.

American Association of Petroleum Geologists, Rocky Mountain Section, second annual convention, Salt Lake City, February 28-29.

March

American Society for Testing Materials, spring meeting, Hotel Statler, Cleveland, March 3-7.

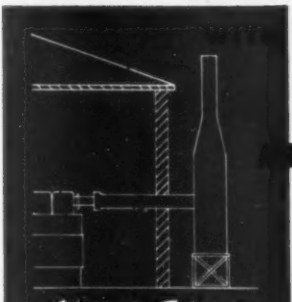
American Petroleum Institute, Division of Production, southwestern district, Washington-Youree Hotel, Shreveport, March 5-7.

National Association of Corrosion Engineers, eighth annual conference and exhibition, Galvez Hotel, Galveston, Tex., March 10-14.

American Institute of Chemical Engineers, regional meeting, Atlanta, March 16-19.

American Petroleum Institute, Division of Production, Mid-Continent district meeting, Broadview Hotel, Wichita, Kans., March 19-21.

COOLER ENGINE ROOMS
LESS PAINT HEADACHES



MAXIM
R INDUCTION SILENCERS

Adequate Silencing
WITH A SINGLE UNIT...

With Maxim, all you need is a single silencer outside and only the exhaust piping inside — a space-saving installation. Exhaust can be run high, low, or underground to fit your requirements.

The venturi-like ejector at the outlet end of Maxim Air Induction Silencers permits drawing air from the engine room and any surrounding areas and circulating it around the silencer and out the discharge pipe. In addition to this very practical ventilation feature, the outside of the jacket, which is continually cooled, retains its protective painting many times as long as would be the case in an ordinary un-jacketed silencer. This greater protection against weather corrosion naturally increases the life of the silencer.

For more information about these practical use-economy features, send for Data Sheet D-170.

Consult MAXIM

THE MAXIM SILENCER COMPANY, 98 HOMESTEAD AVE., HARTFORD 1, CONNECTICUT

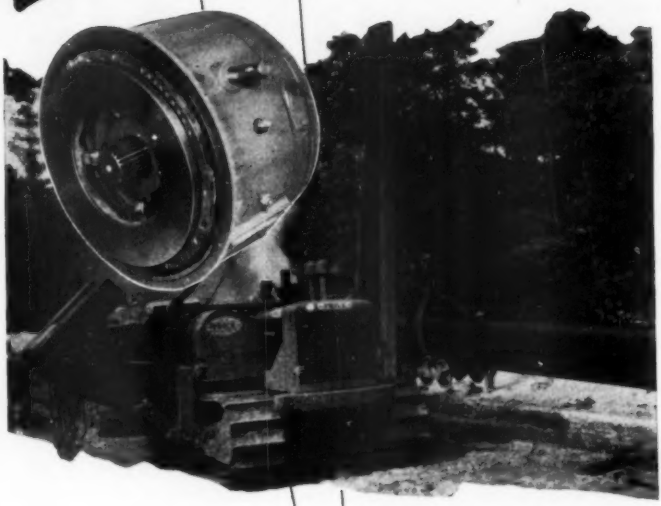
Dept. WL Gentlemen: Please send me your Bulletin on Air Induction Silencers

NAME _____

COMPANY _____

ADDRESS _____

Less Guesswork ...more teamwork



LOWERING IN! That, say the men who know, is the *life or death* step in pipeline building. For, with two or three side-boom tractors working together, all booming out on one long string of pipe, one mischance can topple over a tractor, undo days of work in one minute, can kill a man caught in the melee.

That's the reason why more and more pipeline builders are switching to tractors equipped with Twin Disc Hydraulic Torque Converters, like the Allis-Chalmers HD-20, with a Tractomotive Side-Boom.

They know that the torque converter frees the operator from gear-shift guesswork, lets him concentrate on his boom work. The Twin Disc Converter delivers the power smooth and cushioned. With it, the tractor eases into motion so smoothly there's no tendency for tracks to dig in. Full hp is available at even 1/10 mile per hour.

And most important of all, the converter automatically and instantly matches torque to demand to let the operator *concentrate* on team-work, *not* on gear-shift guesswork. For all these advantages, be sure your next tractor is equipped with a Twin Disc Hydraulic Torque Converter. Complete information is contained in Bulletin 135-D.

TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC DIVISION, Rockford, Illinois

BRANCHES: CLEVELAND • DALLAS • DETROIT • LOS ANGELES • NEWARK • NEW ORLEANS • SEATTLE • TULSA

American Association of Petroleum Geologists, annual meeting, Los Angeles, March 23-27.

American Association of Petroleum Geologists, Society of Economic Paleontologists and Mineralogists, and Society of Exploration Geophysicists, joint annual meeting, Biltmore Hotel, Los Angeles, March 24-27.

Western Petroleum Refiners Association, annual meeting, Plaza Hotel, San Antonio, March 31-April 2.

April

American Petroleum Institute, Division of Production, eastern district, Hotel William Penn, Pittsburgh, April 2-4.

Southwestern Gas Measurement Short Course, University of Oklahoma, Norman, April 8-10.

American Institute of Electrical Engineers, District 7 meeting, Hotel Jefferson, St. Louis, April 15-17.

American Petroleum Institute, Division of Transportation, pipe-line conference, Blackstone Hotel, Fort Worth, April 21-23.

American Petroleum Institute, Division of Production, Rocky Mountain district, Gladstone Hotel, Casper, Wyo., April 24-25.

Southern Gas Association, annual convention, Galveston, Tex., April 28-30.

American Institute of Electrical Engineers, District 1 meeting, Binghampton, N. Y., April 30-May 2.

Natural Gasoline Association of America, annual meeting, Rice Hotel, Houston, April 30-May 3.

May

American Geophysical Union, thirty-third annual meeting, National Academy of Sciences, National Research Council, Washington, D. C., May 5-7.

American Institute of Chemical Engineers, regional meeting, French Lick, Ind., May 11-14.

American Gas Association, Natural Gas Department spring meeting, Biltmore Hotel, Los Angeles, May 12-13.

American Petroleum Institute, Division of Refining, seventeenth midyear meeting, San Francisco, May 12-15.

American Petroleum Institute, Division of Production, Pacific Coast district, Biltmore Hotel, Los Angeles, May 15-16.

American Petroleum Institute, Division of Marketing, midyear meeting, Copley Plaza Hotel, Boston, May 19-20.

Gas Appliance Manufacturers Association, annual meeting, Broadmoor Hotel, Colorado Springs, Colo., May 21-23.

American Gas Association, production and chemical conference, Hotel New Yorker, New York, May 26-28.

June

Pennsylvania Grade Crude Oil Association, annual meeting, Hotel William Penn, Pittsburgh, June 5-6.

Canadian Gas Association, Chateau Frontenac, Quebec, June 8-12.

American Petroleum Institute, midyear standardization meeting, Brown Palace Hotel, Denver, June 9-14.

American Society for Testing Materials, annual meeting, Hotel Statler, New York, June 23-27.

American Institute of Electrical Engineers, summer general meeting, Hotel Statler, New York City, June 23-27.

NOMADS

Tulsa Nomads, third Friday of each month. After Five Room, Tulsa Hotel.

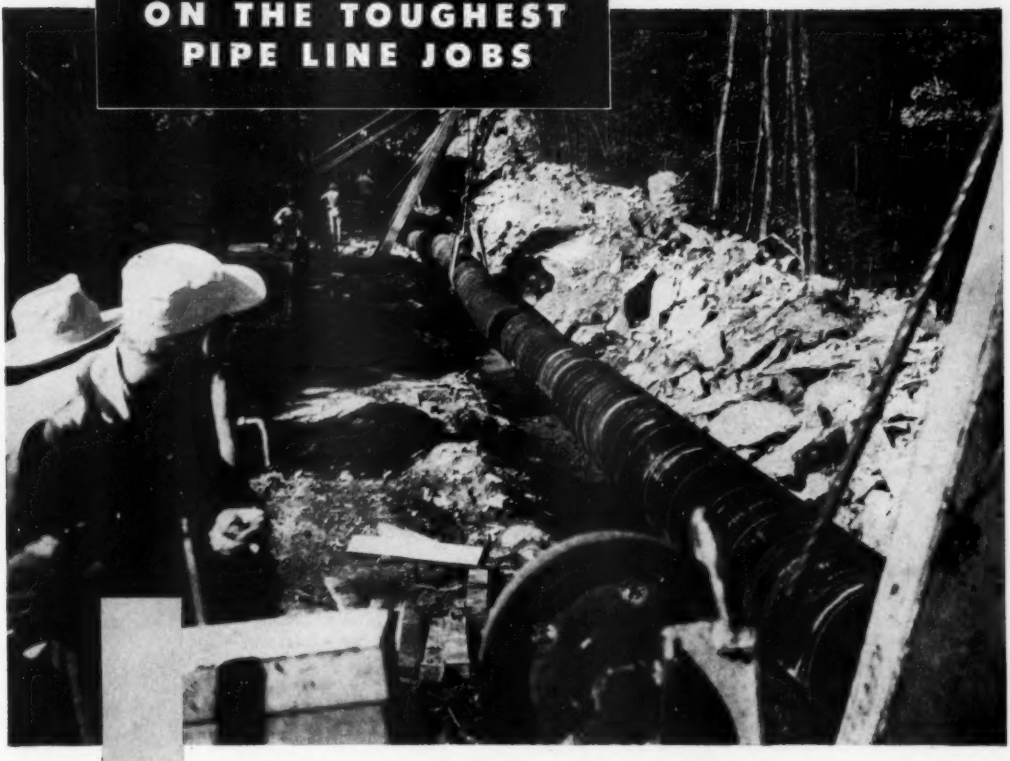
Dallas-Fort Worth Nomads, first Monday of each month, Greater Dallas Club.

Houston Nomads, second Monday of each month, Ye Ole College Inn, Houston.

Los Angeles Nomads, second Wednesday of each month, Jonathan Club.

New York Nomads: December 8, Christmas dinner dance, Hotel Pierre.

ON THE TOUGHEST PIPE LINE JOBS



C. F. & I. Welded Steel Pipe Fits Up Faster—Lowers In Easier

C. F. & I. pipe is made from high-tensile steel plates produced entirely in our own plants and quality-controlled through every phase of fabrication starting with the open hearth. Every length is hydraulically expanded for accurate size and perfect roundness... precision bevelled at the ends for time-saving, labor-saving ease of handling in the field. Available in lengths of 40 feet and in overall diameters from 24 inches through 36 inches. For detailed information, write to Claymont Steel Corporation, Claymont, Delaware.

FLANGED AND DISHED HEADS... CARBON AND STAINLESS-CLAD STEEL PLATES

CF&I

WELDED STEEL PIPE

PRODUCT OF

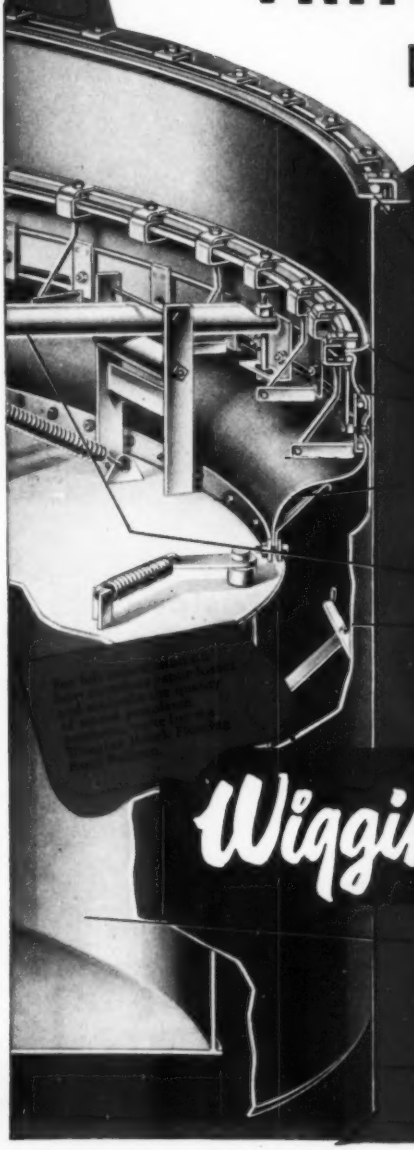
CLAYMONT STEEL CORPORATION

SUBSIDIARY OF THE COLORADO FUEL AND IRON CORPORATION

No other floating roof gives you . . .

TRIPLE SEAL

protection



The improved and never surpassed

Wiggins Floating Roofs

Published every Thursday by The Petroleum Publishing Co., 211 S. Cheyenne, Tulsa, Oklahoma. Founded in 1902. Name changed to The Oil and Gas Journal in 1910 by Patrick C. Boyle.

P. C. LAUINGER
President

S. H. ROURKE
Executive Vice President

HANSON B. PIGMAN
Circulation Manager

ADVERTISING
MITCHELL TUCKER
Vice President

New York Office
500 Fifth Avenue, Phone LOngacre 4-1780
CHARLES A. WARDLEY
Eastern Manager

ROBERT N. CAIRD, JR.
Representative

Chicago Office
106 West Madison, Phone Central 6-2537
C. R. FARMER
Manager

E. S. KLAPPENBACH
Representative

Pittsburgh Office
429 Fourth Ave., Phone Atlantic 1-4835
ALFRED M. JONES
Manager

Tulsa Office
211 S. Cheyenne, Phone 3-6291
JOHN D. REILLY
Mid-Continent Manager
J. PARKER HOLLAND
Production Manager

Houston Office
Sterling Building, Phone Charter 4626
JOHN M. SPEARS
Gulf Coast Representative

Los Angeles Office
650 S. Grand Ave., Phone Vandike 0722
DONALD O. HANSON
Manager

England Office
111 Thorley Lane, Timperley, Cheshire
HARRY BECKER
European Representative
Phone Ringway 4702

Subscription rate to the petroleum industry, United States and foreign, 1 year, $3.00. Single copies, 50 cents. Back copies when over a year old, one dollar. Note: Payments from outside the U.S.A. may be in the form of an international money order or check on a U.S.A. bank. Entered as second-class mail matter at Tulsa, Okla., under Act of March 3, 1879. Copyright 1951 by The Petroleum Publishing Co.

Member
Audit Bureau of Circulations
Associated Business Papers

JOURNALLY Speaking

Tables Turned

OUR Circulation Manager is very earnest about his responsibility of seeing to it that our favorite oil publication gets to genuine oil men and that our precious stock of printing paper is not dissipated among subscribers who have no real interest in the industry. So when he got an application from an official of a government agency in Washington he sent back a questionnaire asking what right the man had to subscribe.

He got back more than he bargained for, because the applicant turned out to be an oil man on loan to the Government but one who has already learned the language and methods of bureaucracy.

"In the past 16 years," he wrote, "I have been connected with the oil industry in the following capacities: Roustabout, pumper, oiler, gas-engine repair, well puller, roughneck, gas gager, depth-pressure operator, and tool pusher.

"I have also served as petroleum engineer, consulting engineer, as superintendent of an independent oil company, and as a bureaucrat of both PAW and PAD. All of these last capacities I trust you will regard as confidential lest they have an adverse effect upon my reputation as an oil man should they become known. In fear that investigation may reveal the facts, I also wish to state, in strictest confidence, that I am a registered petroleum engineer."

Then, lapsing into the gobbledegook of the usual government questionnaire, he went on:

"Having, I trust, established myself to your satisfaction by the foregoing as a qualified member of the exclusive oil fraternity, there is some information which I would like to secure from you before undertaking the capital expenditure necessary to join your circulation list. These may be listed as follows:

"1. The date of founding of the periodical, the founders, and their social antecedents;

"2. A complete list of the staff, their world-wide locations, their experience in the oil business, and an evaluation of each individual's reportorial competence;

"3. A percentage evaluaton by years of the success of all prognostications that have been made since founding (complete with graphs, annotations, and bibliography)."

There was a lot more of the same, quite naturally, because this man is now thoroughly grounded in the basic principles of federal procedure. But he showed that he is still an oil man at heart by adding a postscript: "All joking aside, how about sending the thing up here?"

He got it, but our Circulation Manager may think twice before sending any more questionnaires to government officials.

New Invention

THE disclosure that the Russians have invented secondary recovery has been turned up by Our Man Linz in the course of his indefatigable coverage of the Washington scene.

The earth-shaking revelation was let slip by the Romanian Legation in bragging that production is being revived in oil wells left "profitless" by their former (capitalist) owners.

"The soviet method of secondary recuperation of crude oil is being applied for the first time in Romania," the legation stated. "By injecting water or compressed gas into the oil deposit the residual crude oil is forced toward the wells. Through the application of this method, additional hundreds of thousands of tons of crude oil are being extracted."

Bert went on to say, though without giving the source of his inside information, that Russian scientists are reported now to be working on development of a round mechanism which they will call a wheel, and predict it will make possible the invention of the wheelbarrow.

All Is not Lost

WE read the other day of a scheme to build a gigantic chain of synthetic-fuel plants tied in with oil and gas pipe lines to use coal to make gas in the winter and gasoline in the summer and thus keep the country going when all the oil and gas wells play out. The sponsor of this idea, it didn't take long to figure out, is a coal man. It's downright decent of him to let our industry continue to have pipe lines even though he proposes to take over the rest of it.

Henry D. Ralph.

HOW MANY BUCKS HAVE YOU LOST...

...as a result of ineffective, obsolete methods of casing perforating? Bullets are fine for hunting game, but for perforating oil well casing you will find that the modern Jet process originated by Welex gets the job done faster and better. Welex Jet perforating takes a big bite out of your completion problems by providing on-target shooting with deep penetration and hole density exactly to your specifications. Perforating with Welex Jets, you are in a position to specify hole density for a specific well... with positive assurance that such hole density has been accurately attained with known penetration. With a known condition at the pay zone, management can more readily prescribe effective measures in dealing with many operating problems.... Results cost less with Welex Jets. Call your nearest Welex Station for prompt service—day or night.

ORIGINATORS OF Welex JET PERFORATING

Welex
JET SERVICES INC.

GENERAL OFFICE: 3909 Hemphill Street • Fort Worth 9, Texas
FIELD STATIONS: Ardmore • Lindsay • Shawnee • Hobbs
Corpus Christi • Falfurrias • Houston • Kilgore • Odessa • Wichita Falls

the OIL AND GAS JOURNAL

November 15, 1951

VOL. 50, NO. 28

EDITOR
C. O. WILLSON

MANAGING EDITOR
Kenneth B. Barnes

NEWS EDITOR
Henry D. Ralph

REFINING EDITOR
George H. Weber
500 Fifth Avenue, New York

INTERNATIONAL EDITOR
Dahl M. Duff
500 Fifth Avenue, New York

PIPE-LINE EDITOR
Paul Reed

TECHNICAL EDITOR
W. L. Nelson

ASSOCIATE EDITORS
Lynn M. Nichols
Neil Williams
R. B. Tuttle
Philip C. Ingalls
John C. Casper

DISTRICT EDITORS
D. H. Stormont
450 S. Grand, Los Angeles
Carl F. Hoot
Mercantile Bank Bldg., Dallas
Victor Lauriston
35 Stanley, Chatham, Ont.
Bertram F. Linz
631 Albee Bldg., Washington
Walter Rose
Sterling Bldg., Houston
F. Lawrence Resen
Sterling Bldg., Houston
Ted A. Armstrong
211 S. Cheyenne, Tulsa
Joseph A. Kornfeld
211 S. Cheyenne, Tulsa
John C. Reidel
211 S. Cheyenne, Tulsa
William P. Sterne
211 S. Cheyenne, Tulsa
Robert J. Enright
211 S. Cheyenne, Tulsa
Roy F. Carlson
McClintic Bldg., Midland, Tex.

EDITORIAL ASSISTANTS
Polly DeArmond, Tulsa
Connie Farrar, Tulsa
Martha Allbright, Tulsa
Lucy Dee Owen, Houston

CORRESPONDENTS AT
Denver, Pittsburgh, Calgary, Columbus, Ashland, Ky., Oil City, Pa., and Mount Pleasant, Mich.

• NEWS FEATURES

A.P.I. Speakers See Huge Oil Demands, Facilities Shortages, No War 107
Hot Synthetic-Liquid Fuels Issue Boils Over at A.P.I. Meeting 108
Pinch on Steel and Alloying Elements to Continue Until 1953 109
More Steel Earmarked for Pipe Lines, Terminals in First Half of 1952 110
New Chairman of Board, Vice President, Nine Directors Named by A.P.I. 111
Pleased Chapman Will Disregard Pressure for Government Head of NPC 112
A.P.I. Seeks Broadening of Industry's Radio-Service Regulations 114
Alaskan Exploration Program Through 1953 Recommended to Navy 115
Big Oiler Gives New Life to Old Greasewood Pool in Colorado 115
Oil's Long-Term Growth Potential Good Under New Demand Pattern 116
Imports, Exports of Crude and Products Decline Slightly in September 116
Scurry Studies Indicate Big Recovery Through Conservation Plan 117
Seeps in Old Rank Wildcat in Mississippi Lead to New Gas Discovery 117
Some of Aramco's Biggest Headaches Not Concerned With Oil Operations 118
Danger Seen in Exclusion of Industry From Washington Talks on Iran 123
Pakistan Petroleum Drilling 10,000-Ft. Test in Pakistan Wilderness 126

• ENGINEERING-OPERATING FEATURES

Development in Hugoton Gas Fields 132
Sulfuric Acid Regeneration at Cities Service Refinery 134
New Light on Jet-Bit Drilling 136
Porosity Index in Limestone From Electrical Logs 140
Conversion of Crude-Oil Lines to Refined-Products Service 144
Nipple Holds Gager's Report 159
Skid-Mounted Lease Unit 159
Corrosion Testing for Refinery Components 161
Questions on Technology 163
Canadian Oil's New Lubes Plants 164
Application of Houdriforming to Aromatics Production 166
Mud-Pump Connections 179
Laying Down of Pipe Expedited by Novel Sand-Line Device 179
Refiner's Notebook—Initial Steps in Instrument Installation 181

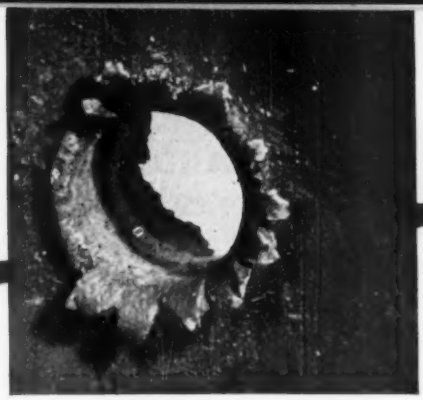
• EXPLORATION-DEVELOPMENT

Washington's Wildcat 207
Highlights of Week's Developments 207
Reports by Areas Start on Page 208

• REGULAR DEPARTMENTS

They Say 92
Calendar of Events 97
Journally Speaking 101
Editorial 105
This Week 106
Watching Washington 113
International News 118
Personals 127
Deaths in the Industry 130
Books 176
Pipe-Line Construction 183
Natural-Gas News 191
Natural-Gasoline News 191
Pipe-Line News 193
Refining News 199
Drilling Contractors 203
Exploration Statistics 234
Production Statistics 235
Refining Statistics 236
Market Statistics 237
Equipment Men in News 239
Classified Advertising 241
Advertisers' Index 245

DANGER



DO NOT RUN packers, testers, swabs or retainers

...until the "working surface" of your casing is clean

This typical burr resulting from a gun-shot hole, clearly shows why so many operators always consider it a "must" to clean the WORKING SURFACE—the vital inner wall of casing—with the new Baker ROTO-VERT Casing Scraper.

It is easy to see why tools with rubber cups, or a rubber packing element, many times fail to set properly, and often are cut, torn and hopelessly damaged while running-in the well. Ninety-nine times out of a hundred, premature setting of packers, testers and retainers, or their failure to effect a leak-proof pack-off, is due *not* to faulty construction or operation of the tool, but to burrs, cement, hardened mud, or other obstructions which . . . PREVENT PASSAGE OF THE SLIPS • CUT OR OTHERWISE DAMAGE THE PACKING ELEMENT; *or* • PRESENT SUCH A ROUGH, UNEVEN SURFACE THAT A LEAK-PROOF PACK-OFF IS IMPOSSIBLE.

The new Baker Model "C" ROTO-VERT Casing Scraper is a helix-blade-type scraper which can be either rotated or "spudded" (reciprocated vertically) for the removal of perforation burrs, imbedded bullets, cement sheath or other obstructions from the inner wall of casing. The body is machined from bar stock, with two sets of machined (not cast) blades positioned for overlapping, 360-degree scraping coverage.

The direction and angle of shear of the deeply hard-faced cutting edges is *exactly opposite* from other helix-blade-type scrapers, which means that the scraping edges of the ROTO-VERT will not "screw down" past burrs, but will actually *shear away* burrs, cement and other obstructions.

CHOOSE THE BAKER CASING SCRAPER EXACTLY RIGHT FOR YOUR WORK

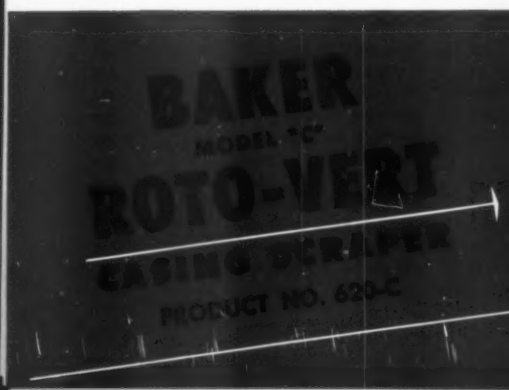
The new ROTO-VERT Scraper is at its best where hundreds of burrs, with possible imbedded bullets, or unusually long stretches of hardened cement must be removed. It operates successfully *with* or *without* rotary equipment.

For normal scraping, where rotary equipment is present, the time-tested Baker Model "B" Casing Scraper, Product No. 620-B, continues the popular choice of many operators.

Why not get in touch with your nearest Baker representative and secure specific recommendations for your next job? Or send for the new illustrated 28-page booklet which contains complete information on the important subject of Casing Scraping the Baker Way.

BAKER OIL TOOLS, INC.

Houston • Los Angeles • New York



Scrapes the "WORKING SURFACE" of your casing CLEAN and SMOOTH

Millions and Billions

Millions of barrels of additional oil will be needed during the next few years and it will take billions of dollars to provide it. This theme was prominent among the topics discussed at the A.P.I. meeting last week.

Where the oil will come from was not doubted by anyone. It will be found in the earth and brought to the tanks of consumers by the oil industry if it is left free to function in its accustomed way.

Where the money will come from is less certain. And this is ironic. Often in the past many people have doubted that the world would have enough oil, but no one ever questioned that there would be money to develop oil as long as there is oil to be developed. But today the industry faces a steadily expanding market and a possible shortage of capital to serve that market.

This situation is no reflection on the ability of the oil industry to return a good profit to its investors. It could exceed most other industries in this respect and still have difficulty financing the upwards of 2 billion dollars of expansion needed annually.

The root of the trouble lies in government, in national and international policies which have resulted in drying up the traditional sources of capital accumulation. Formerly the oil industry generated much of its own capital by plowing back earnings while still treating customers and investors fairly. But now corporation taxes are so heavy that only a relatively small portion of the needed capital can come from earnings.

These high taxes likewise are draining off savings which might flow to oil from outside sources; and they make risk taking unattractive to most investors. And high taxes plus deficit spending cause inflation which makes oil dollars worth less in terms of materials.

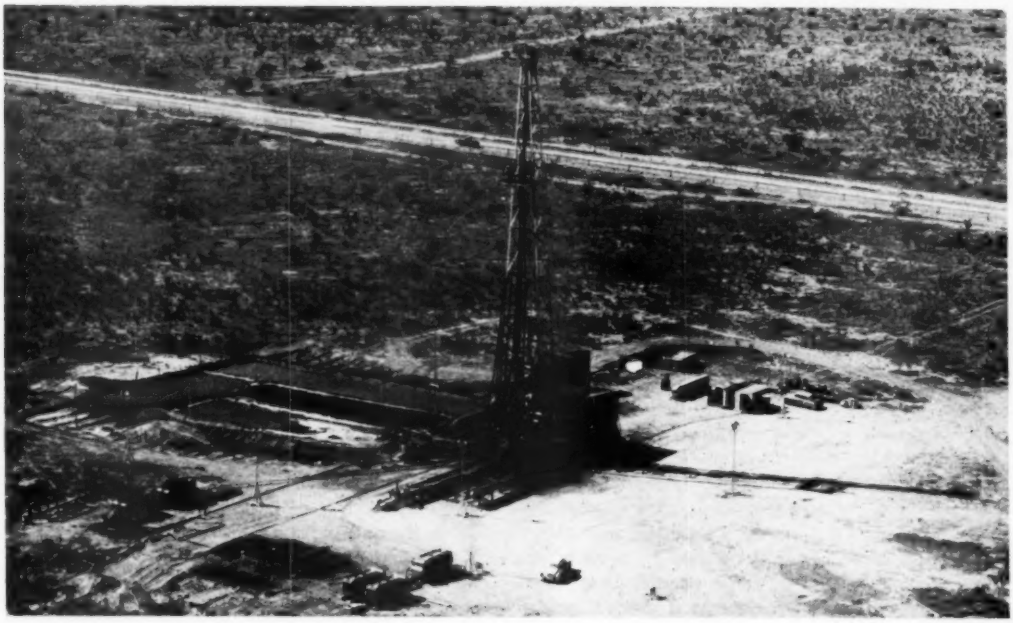
Much of the oil to be developed during the next decade probably will be outside the United States, but most of the money to develop it unquestionably will come from the United States. Our Government now is virtually supporting the economies of a number of nations, in part to permit them to purchase petroleum supplies. If private capital is insufficient to develop the oil needed by friendly nations, quite probably our Government will undertake the job, and this would mean higher taxes here and a further curtailment of investment funds.

Unless this vicious circle is broken it will in time curtail the activities of independent producers, drilling contractors, and small companies as well as of the great majors.

Without attacking the need for defense and foreign economic aid, and without wailing over paying its own share of taxes, the oil industry and everyone in it can well make plain to the Government and the public that without new capital there will be little new oil in years to come.

Millions of barrels of oil can be furnished the world provided the industry can keep or attract the billions of dollars needed for expansion.

THIS WEEK



AIR-DRILLING RIG.—Shown here is Wilshire Oil Co.'s big rig using the new air-drilling method to penetrate the tricky Spraberry formation. The rig is on the company's 5-21 Hunt in Upton County, Texas. Instead of mud, compressed air is circulated in the air-drilling method to cool the bit and bring up cuttings. Usual practice is to reverse the flow, forcing air down the casing and blowing the cuttings up the drill pipe. In the foreground are 500-c.f.m. skid-mounted portable compressors for first-stage compression. Second-stage 400-c.f.m. machines may be seen at left with fire-fighting chemicals and other equipment. Floodlights for night operation may be seen placed around the rig and at some distance from it.

INTERNATIONAL—Industry concerned over nature of talks between State Department and Mossadegh. . . . Companies fear settlement on Iranian terms would undermine concession contracts in other areas. . . . ¶Engineering work commenced by Kellogg on first major oil refinery in Chile. . . . Plant will have 20,000-bbl. capacity, be operated by the government. . . . ¶Standard-Vacuum reveals it is negotiating with Government of India for construction of refinery there. . . .

TRENDS—Total major-product stocks decreased 200,000 bbl. daily for week ended November 3, the first net drop of the season. . . . Increases in distillate stocks are smaller, up 98,000 bbl. daily for 2 weeks ended November 3 compared with 258,000 bbl. daily for previous 5-week period. . . .

ACTIVITY—Crude production averaged 6,139,715 bbl. daily for week ended November 10, down 82,560 bbl. daily. . . . ¶Well completions decreased 12 for the week to 905. . . . Wildcat completions totaled 201 compared with 209 for previous week and 179 for same week last year. . . . ¶Rotary rigs operating in United States on November 5 set a new all-time record at 2,918, a gain of 543 rigs over same date in 1950. . . .

FORECASTS—Alloy steels to remain in short supply through next year, becoming scarcer in near future before picture starts to change, symposium of A.P.I. advisory committee indicates. . . . ¶Socony-Vacuum experts predicts 36 per cent increase in demand overcoming 10-year period. . . . Sets free-world demand for oil 10 years hence at 15,000,000 bbl. per day. . . . ¶Texas' Gov. Allan Shivers predicts principal industry problem in coming years will be encroachment of government on private industry. . . . ¶Engineers forecast additional recovery of a billion barrels of oil from Scurry reef pools if proposed unitization plan is adopted. . . .

REFINING—Shell receives accelerated-amortization certificate for project to boost capacity of Wood River refinery from 120,000 to 170,000 bbl. per day. . . . Project to cost $42,500,000, require 3 years. . . . ¶Labor Department finds there is no labor shortage now in refining industry, but expansion may change picture next year. . . . ¶Interior Secretary Chapman, oil-industry leaders split sharply on synthetic-fuels program. . . . Chapman says only lack of money prevents Government from starting construction on first huge plant immediately. . . .

PIPE LINES—FPC approves 189-mile, 26-in. line of Texas Gas Transmission from Acadia Parish, Louisiana, to connect with line in Morehouse Parish. . . . ¶Texas Pipe Line Co. to expand, consolidate crude system. . . . Project will include laying of 195-mile, 16-in. line from Corsicana and Houston. . . . ¶United Gas Pipeline places 93-mile, 16-in. gas line from bay fields to New Orleans in operation. . . .

Looking Ahead

Forecasters see another 10 years of industry growth, with government providing the major problems and headaches

Henry D. Ralph

CHICAGO.—The oil industry took a long look ahead during the meeting of the American Petroleum Institute here last week, and what it saw reflected the traditional optimism of the business.

It saw no war but a long period of uneasy truce and military preparedness, a huge increase in demand for petroleum products throughout the world, a shortage of facilities and of steel to expand them during the next couple of years at least, and a tremendous financing task in meeting growing demands, but above all it saw the industry fulfilling its obligations during the coming decade.

Ironically, the biggest obstacles foreseen were those imposed by government—inflation, crushing taxation, controls, threat of nationalization, operation of synthetic-fuel plants, and control of offshore oil developments—and against all of these the industry registered its firm opposition.

The assumption of continued but uneasy peace ran through all of the forecasts and was bolstered by the major address of Gen. Omar N. Bradley, chairman of the Joint Chiefs of Staff, who outlined the defense program as an expensive risk but one calculated to prevent world conflagration.

Demand outlook.—Based on this assumption, a number of speakers undertook the role of prophet and presented forecasts of the future need for oil and the ways in which the need will be met. In fact, one of the notable features of this A.P.I. meeting was the degree of emphasis on long-range planning.

With great unanimity these speakers forecast a large and virtually steady increase in world demand, with the problem less one of finding the needed oil than that of finding the money to discover and develop it.

And foreign oil was foreseen as more of a blessing than a threat to the domestic industry because of the forecasts that demand will increase faster outside of the United States than inside and that foreign oil will fill foreign needs and relieve the drain on domestic resources. *(The Oil and Gas Journal, November 8, pages 163-166.)*

Prominent among such forecasters was Thomas W. Phelps, assistant to the chairman of the board of Socony-Vacuum Oil Co., Inc., who phrased his prediction thus:

"Our crystal-ball department in Socony-Vacuum expects world demand for petroleum products 10 years from now to be above 15,000,000 bbl. a day, excluding Soviet Russia and her satellites. That means 4,000,000 bbl. a day more than estimated world demand for the year ending next month. It means adding more than 36 per cent to the great job being done by the world's oil industry this year.

"Being oil men, our forecasters naturally predict that no matter what world demand is, it will be met. They estimate that world crude-oil producibility will rise from 12,000,000 bbl. a day in 1951 to more than 16,000,000 bbl. a day 10 years from now, an increase of a third. In other words, they figure that in 10 years the world will be able to produce 4 bbl. a day for every 3 bbl. a day it can produce now."

Financial requirements.—To achieve this will require the investment of $23,200,000,000 during the next decade, Phelps estimated.

He arrived at this multibillion figure by several approaches. Based on a study showing that gross assets of the United States oil industry in 1950 were about 33 billion dollars, he figured the investment was $5,600 per daily barrel of integrated capacity. Multiplied by 4,000,000 bbl. additional capacity this showed a need for $22,400,000,000 new investment by 1961. If half of the increased demand is to be in the United States, the domestic industry must invest $11,200,000,000.

Taking another approach, Phelps took the Socony-Vacuum figure of $2,450 per daily barrel as the cost of exploration and development of new crude oil in this country and added the National Petroleum Council's estimate of $1,220 per barrel for transportation and refining and came out with a figure of $3,670 as the investment required for each additional barrel of daily capacity, not including marketing facilities. But, he declared, the NPC figure for refining included only some urgently needed immediate additions in existing facilities, whereas $1,500 per daily barrel would be a more representative cost of providing new and balanced refining facilities.

Still a third calculation indicated that during the past 5 years the United States industry spent $11,400,000,000 to increase producing capacity by 2,380,000 bbl. and refining capacity by 1,650,000 bbl. daily, giving a cost per barrel of additional capacity roughly $5,800.

This third figure, Phelps said, is likely to be the most realistic, and the staggering total of $23,200,000,000 must be invested in oil facilities to keep pace with the next decade's requirements.

Foreign-oil need.—Together with a number of other speakers on the A.P.I. program, Phelps urged continued American development of foreign oil sources, not so much as a source of supply for this continent as to maintain the economy of western Europe and other friendly nations. He put it this way:

"We Americans have accepted the fact that we have a vital interest in the economic health and political freedom of western Europe. We do not so generally realize that western Europe is dependent on Middle East oil. Now, if western Europe is vital to us (and we are saying it is to the tune of billions of dollars) and if Middle East oil is vital to western Europe, then Middle East oil is vital to us.

"That is just another way of saying that everything that might reduce the flow of oil from the Middle East would throw an additional burden on the American industry. That burden, it seems to me, is inescapable. If we refuse to recognize it the day might come when all of the billions we have poured into the economic reconstruction of western Europe would have to be written off as lost."

Demands to be met.—In similar vein Eugene Holman, president of Standard Oil Co. (N. J.), predicted that the rate of increase in demand for petroleum products would grow fast in the United States and even faster abroad, and that the oil industry will be able to meet these demands.

The great bulk of the oil that American consumers will use in the years ahead will undoubtedly come from domestic fields, Holman said, but continued development abroad is desirable in order to take care of the expected increase in consumption outside this country.

Government fears.—This same confidence in the industry's ability to meet demands was echoed by Gov. Allan Shivers of Texas, but he bluntly added a proviso only hinted by other speakers. The industry can do it, he said, provided the federal Government does not hamstring it with unnecessary regulation and threats of nationalization. This danger is very real, said the Texas governor, as it is the goal of "our busy little bureaucrats in Washington."

As an example he cited the fed-

eral attempt to control offshore oil development, declaring: "The tidelands belong to the states, the national administration is trying to steal them, and I'm against it." He warned that the administration is now attempting to circumvent Congress and take over administration of offshore oil lands by a devious legal process, which he described as "theft without license."

The governor's outspoken words on this subject were in direct defiance of the message sent the A.P.I. by Secretary of the Interior Oscar L. Chapman. In his address he flatly announced his intention of proceeding with offshore oil development under federal auspices.

Synthetics Feud

Chapman says only lack of money is holding up building of synthetics plants; oil men oppose government invasion

CHICAGO.—The smoldering question of development of synthetic liquid fuels broke into open flame on the platform of the American Petroleum Institute last week. A cabinet officer announced the Government's intention to push the program with all means possible, while industry spokesmen denounced the scheme as unnecessary and unwise.

"I deem it my plain duty as Secretary of the Interior," said Oscar L. Chapman in an address read for him before a general session, "to advance the development of liquid fuels from shale and by synthesis from coal, by any and all feasible, reasonable, sensible means consistent with national laws, national interests, and national policy.

"That may not be your job, but I think that on reflection you will agree it is a job someone must do and that it is, in fact, a part of my job as Secretary of the Interior."

Porter's view.—Diametrically opposed was the speech of the A.P.I. president, Frank L. Porter.

"We cannot afford at this time," he said, "the luxury of wasteful and unnecessary uses of materials and manpower. The large expenditures of money, time, and effort necessary for the development of large-scale plants to make liquid fuels from solid materials seem undesirable in the present emergency.

"At this time, with the great amount of unexplored future petroleum prospects which we have for the production of natural crude oil and gas, the building of commercial synthetic plants is an unwarranted use of capital, labor, and materials. Whether synthetic-fuel development is carried on by government directly or through subsidies, it becomes a competitive element which will have a substantial effect upon the future exploration of our natural petroleum resources."

Holman's position.—No less outspoken was Eugene Holman, president of Standard Oil Co. (N. J.). Discussing future supplies of liquid fuels he mentioned the possibility of production from shale and coal and asserted:

"We know how to do this right now. And I believe investigation to increase our knowledge of the processes—with the intention of making them more efficient and more economical—should continue in laboratory and pilot plant.

"I believe the oil consumer will be best served, however, if the development of synthetics develops in a normal manner under the influence of straightforward economics. Schemes for artificially forced growth might actually retard sound long-term development.

"Normal economic indicators will point to the times for expansion in the synthetics field and will provide the normal incentives to bring that expansion about. Those normal indicators will be responsible for the development of a synthetic program tied in to the over-all liquid-fuel pattern in the most efficient way.

"As the suppliers of energy, I know we in our company intend to keep on serving our customers from whatever source is best. When the time comes that synthetics seem necessary for this purpose, we will certainly begin making them."

Chapman's argument.—But these industry sentiments didn't jibe at all with Chapman's reasoning, even though he tempered the blast with such statements as:

"I would like to think that I am not following a different path from you; rather that I may be a mile or two ahead of you on the same path. In any event, I want you to remember that it was the Congress of the United States, on the recommendation of my department, and through my efforts, that decided that the federal Government—that is the Department of the Interior—should take the leadership in the field of synthetic liquid fuels.

"It is perfectly evident that the time will come when this nation must rely in part on liquid fuels produced from coal or shale. I do not need to prove that point to petroleum men because your own leaders have written, spoken, and testified eloquently on the subject. We can argue with each other about 'when' and about 'how' but not about 'whether.' We all agree that the time will come."

The secretary declared that on the basis of present-day economics it appears that a large-scale operation for extracting oil from shale may be feasible and that such a project is justified. He admitted that the cost outlook is not so favorable but declared that the immediate establishment of one or two plants employing the coal hydrogenation process will pave the way for larger production when needed and also will make valuable contributions of critically needed chemicals.

Referring to his pending request for allocation of $100,000,000 of federal funds to finance synthetic-fuels plants, Chapman said he would obtain competient technical advice before approving any particular plant or process. But he made it plain that he intends to go ahead if he gets the money.

Higher Ceilings Talked

CHICAGO.—Any increase in crude-oil price ceilings, whether general or local, must be accompanied by commensurate increases in product ceilings if the small independent refiners of the nation are to survive, members of the Independent Refiners Association were told at their annual meeting here last week.

The association, while sympathetic with problems of the independent producer arising out of his increasing costs, called attention to the large increases in operating costs of independent refiners since price ceilings were imposed. This makes it necessary, the association reported, that increases in products price ceilings go hand-in-hand with any adjustments in any local or general increases in crude-oil price ceilings.

Directors for the coming year include: M. H. Robineau, Frontier Refining Co., president; J. Howard Marshall, Ashland Oil & Refining Co., vice president; Max Fisher, Aurora Gasoline Co.; R. B. Kahle, Eastern States Petroleum Co.; Clarence Rice, ElDorado Refining Co.; James P. Dunnigan, Producers Refining, Inc.; Lloyd Freese, Bell Oil & Gas Co.; and Normal L. Meyers, general counsel.

New Firm in Making

DENVER.—A new firm, Midwest Oil Corp., will be formed through the merging of Midwest Oil Co., Saltmount Oil Co., and Mountain Producers Corp., if stockholders approve at separate meetings December 3.

Midwest and Mountain Producers both own substantial interests in Salt Creek oil field in Wyoming, while Saltmount has large royalty and lease holdings in Texas and other states.

The merger agreement is expected to take effect December 31 if stockholders approve.

Steel Outlook

Situation to worsen further this year with shortages to remain in 1952; steps to lighten oil's problems outlined

George Weber

CHICAGO.—The situation on steel and alloying elements is going to get worse before it gets better.

Military demand for raw materials will reach a peak late this year. New production of some materials is coming in next year, but copper and nickel will continue in short supply for a long time.

Full relief on steel is not expected until 1953. Meanwhile, the oil industry has recourse through a number of channels to alleviate, if not to solve, the coming shortages of alloy steels. These possible steps occupied principal attention in a symposium last week sponsored by the American Petroleum Institute Interim Advisory Committee on Alloy Steels.

Firm, adjusted requirements for carbon steel now exceed available supply by 50 per cent, said Matthew Rose, speaking for Melvin L. Anshen, assistant deputy administrator in the Office of Program Requirements, Defense Production Administration. On the same basis, structural and plate steel requirements are currently double the supply.

These shortages will require reduction of all high-priority estimates of steel needs by PAD and other claimant agencies representing users in the "must" categories. Even after estimates are pared and deferments made, further percentage cuts will be in order.

Deferred allocations will affect least the military and the Atomic Energy Commission. In the next favored category come the petroleum, steel, aluminum, and power industries, together with the military-expansion program. In line for greater deferments come public schools, housing and roads, the needs for maintaining the civilian economy, and exports supporting our foreign policy. PAD has been asked to push oil expansion and to defer gas programs.

Alloy situation.—The situation on alloying elements is serious, said E. V. Bennett, consultant to the metallurgical and conservation branch of the Iron and Steel Division of the National Production Authority.

The most critical shortages exist for cobalt, columbium, nickel, tantalum, molybdenum, and tungsten. In better supply are chromium, manganese, silicon, and vanadium. Boron, available in unlimited quantities, was urged as a substitute for some of the more critical alloying elements.

Nickel is now 50 per cent out of balance, with a 20 per cent increase in production expected next year. Molybdenum is 25 per cent out of balance now, with some relief anticipated for 1952. However, the new production of these two vital elements may well be absorbed by increased military demands.

Scrap drives urged.—The most urgent problem the steel industry faces today is scrap, according to NPA spokesmen.

With more scrap than pig iron now going into steel, some mills are down to rock bottom on scrap. Scrap requirements for 1951 are estimated at 36,000,000 tons, as compared with 29,500,000 tons last year and 24,500,000 tons during the biggest year of World War II.

A major contribution to the scrap drive can be made by the oil industry, and companies are strongly urged to take organized steps supporting it.

Refining problems.—A five-man panel on conservation of critical alloys outlined the problems facing the producing and refining divisions in reducing alloy content and making suitable substitutions for critical elements.

There is little doubt that, if all the needed information were available, significant conservation of alloying elements in steels used for refinery service would be entirely possible, said Carl H. Samans, of Standard Oil Co. (Ind.), who substituted for George W. Watts, of the same company.

In most instances, however, this information can be secured only by service experience, and since the same process in different refineries is seldom used to treat identical crudes under exactly the same conditions, this service experience can only be secured by actually running a plant.

It is probable that the corrosivity of crudes will increase steadily and that byproduct recovery, which frequently means greater corrosion, will increase.

These new processes, new raw materials, and new chemical products raise questions concerning corrosion which just cannot be answered without experiment and study. The best that can be hoped for, therefore, is the use of good judgment by the technical men with the greatest experience.

Steps taken.—A practical approach toward conservation of alloys has taken the form of some tentative recommendations by a study group on the subject.

These include standardization of alloys and the simplification of compositions rather than the elimination of alloy steels or the maximum efficient alloy utilization.

A reduction in the molybdenum content from the .45 to .65 per cent range to a .40 to .60 per cent range was recommended. Further, the many alloys now in demand have been standardized to a recommended five grades: carbon ½ moly, 1½ chrome ½ moly, 5 chrome ½ moly, 7 chrome ½ moly and 9 chrome 1 moly.

Tonnage can be further reduced by specifying thinner walls in designing tubes and vessels for shorter life. These recommendations were reported by Maynard S. Northup, Standard Oil Development Co.

Top A.P.I. Award

Ernest O. Thompson, right, receiving the American Petroleum Institute's Gold Medal for Distinguished Achievement from W. Alton Jones, president of Cities Service Co. and retiring chairman of the A.P.I. board of directors. Thompson, senior member of the Texas Railroad Commission, was chosen for the award in recognition of his "outstanding work in petroleum conservation." The presentation was made during the annual A.P.I. meeting in Chicago.

Gasification Successful

GORGAS, Ala.—Gases suitable for driving gas turbines and generating steam can be obtained through underground gasification—the burning of unmined coal in place—the Bureau of Mines reported following extensive tests here.

Further tests may prove the feasibility of producing gases for conversion to synthetic-liquid fuels or chemicals, the bureau stated.

During one phase of the operation, two gas turbines were installed and operated for 100 hours on combustible gases captured from the burning coal. Energy produced by the turbines was used to compress air and send it back underground to the gasification system.

The experiments, staged jointly by the bureau and Alabama Power Co., were pioneered between January 21 and March 12, 1947, and from March 18, 1949, to February 7, 1951.

Steel-Plate Picture

More to be available next year for pipe lines, tankage, but it won't be enough; PAD explains allocation method

CHICAGO. — More steel will be available for the construction of oil pipe lines and terminals during the first half of next year but the quantity will still be considerably short of the needs of the oil industry.

Such was the picture painted for the American Petroleum Institute meeting here by George A. Wilson, director of the supply and transportation division of the Petroleum Administration for Defense, the man in charge of dividing up available steel among the many applicants for new construction.

A good many projects that should be finished soon will have to be delayed until late in 1952 and perhaps into 1953 unless there is substantial improvement in the availability of materials, he warned.

For the last two quarters of 1951 PAD requested 895,000 tons of carbon steel for the construction of oil pipe lines and terminals, but was allotted only 514,000 tons, or less than 58 per cent of what PAD figured was the minimum needed.

For the first quarter of 1952, Wilson explained, PAD has been allotted 368,000 tons of line pipe and 65,000 tons of plate for tanks. However, Wilson explained, these quantities are by no means adequate to permit construction of all projects needed. Large portions of them must be used to fill allocations made for previous quarters but not obtained because of the shortage of steel, and an unknown amount must be given to the military for storage projects.

Allocation method. — Explaining how this steel is doled out by PAD, Wilson said, allocations for pipe lines and tankage go wherever they will accomplish the most for the smallest expenditure of steel.

"In crude-oil pipe-line construction, this normally has involved getting crude oil to the market out of producing areas which otherwise would be shut in. For example, it has led us to concentrate a sizable portion of our steel for pipe in trunk lines moving crude out of West Texas to the Gulf Coast and out of the Rocky Mountain area into District II.

"In like manner, pipe has been allocated for construction of crude-oil gathering lines in producing areas not already served by existing lines. Many, many projects of this type receive pipe allocations as rapidly as we have steel available to distribute. They deserve a top rating in our allocation. Conversely, we cannot afford to allocate steel for crude lines into areas which already are adequately served by existing pipe lines.

"Steel has been allocated to either crude or products pipe lines only when existing alternative transportation quite definitely could not meet essential needs. We have been unable thus far to justify allocations of steel for pipe line expansion or construction solely to provide cheaper transportation or to improve position of a given company or group of companies. When steel is that plentiful. we as Government should no longer have anything to say about where it goes."

Steel for tanks. — The Government will look with favor on applications for tank steel for seasonal storage at marine or pipe-line oil terminals if this storage is to be located in an area of consumption, Wilson said.

Such tankage contributes greatly toward flattening of the transportation load through the year. This does not mean, however, that all applications for steel for such projects can be wholly approved. "In order to be fair to all applicants for tank steel, we must limit steel allocated for each such project to the amount required to permit reasonable even monthly deliveries to the terminal throughout the year," Wilson said.

"Generally speaking, the Supply and Transportation Division recommendations for allocations of tank steel will favor the colder northern areas during the second and third, or summer, quarters. This seems to us to be logical for two reasons. First, construction is more costly and hazardous in the North during the winter. Secondly, most storage erected during the winter is of little value in delivering product to consumers until the following winter."

Early application. — Now that CMP has been in operation for some time, Wilson said, it should be possible for operators to advise PAD of its anticipated steel needs for all of 1952 before the close of this year. This need not be in the form of applications on PAD 26 initially but may simply be a letter.

Such advance notice will enable the agency to appraise essentiality of projects over a longer period, will support and verify PAD's requests for steel to the Defense Production Administration, and smooth out the work load in handling allocations of controlled materials, Wilson said.

New O.I.I.C. Head

Hardwick to take over from John L. Dupree January 1

CHICAGO.—Charles Z. Hardwick, vice president and director of Ohio Oil Co., was elected 1952 chairman of the Oil Industry Information Committee during the thirty-first annual meeting of the American Petroleum Institute.

C. Z. HARDWICK

Hardwick will take office January 1, succeeding John L. Dupree, of Socony-Vacuum Oil Co., Inc. Hardwick is manager of refining and marketing operations for the Ohio Oil Co.

New vice chairmen of the O.I.I.C. elected at the same time include Philip C. Humphrey, manager of public relations for The Texas Co., New York; Stewart Brown, manager of public relations, Standard Oil Co. of California, San Francisco; Stanton K. Smith, president of Smith Oil & Refining Co., Rockford, Ill.; William Finnegan, special advisor to the president of Humble Oil & Refining Co., Houston; and Ralph Carey, Shell Oil Co., Boston.

Quarterly meetings of the committe have been scheduled for February 18 in San Antonio, May 19 in San Francisco, September 9 in Atlantic City, and November 8 in Chicago.

"Know-How" Articles—Next Week

Refinery Maintenance.—Engineers of Aurora Gasoline Co., Detroit, find speed and simplicity in pneumatic application (Gunite technique) of insulation on furnace interiors.

Refinery Instrumentation.—Report tells how to get greater stability in refinery-process operation through new developments in "Fast Control Loop."

Exploration-Drilling.—Journal's Dallas district editor assembles factual progress report on Sandusky fields (three pay formations) located in Grayson County, North Texas.

Evaluation of Reserves.—Electric logging expert, M. P. Tixier, Schlumberger Well Surveying Corp., presents scaled templates (cutout models) to obtain porosities of limestones from well-survey data.

Spraberry Symposium.—Papers presented at Spraberry Conference recently held at Midland, Tex., under auspices of Texas Petroleum Research Committee. Included in Part I will be "Drilling and Casing Procedures," "Hydrafrac Operations," "Air-Drilling Operations," and "Mud Programs."

Diversion Plea

Dorwin asks action to halt nonhighway use of money

CHICAGO.—A plea for action to reduce the diversion of gasoline taxes to nonhighway purposes was sounded here during the meeting of the American Petroleum Industries Committee.

Oscar John Dorwin, general counsel of The Texas Co. and A.P.I.C. chairman, said funds for highways from gasoline and other levies may total nearly $60 billion during the next 10 years.

He warned, however, that to translate this income into better highways means a continuing fight against diversion, the use of the money for other purposes, and dispersion, use of the income on vast mileage of little-used roads.

Samuel B. Pettengill, of Pure Oil Co., told the A.P.I.C. forum that American business leaders have the responsibility of doing all in their power to prevent this country from spending itself to destruction.

While the effective tax rate on business earnings is now the highest on record, he said, the proportion of business earnings available for working capital and expansion will be the lowest on record.

Warren Acquires Devonian

Warren Petroleum Corp. has acquired 100 per cent ownership of Devonian Co. through a percentage-of-production arrangement with Gulf Oil Corp.

W. K. Warren, president, said that the 25 per cent stock interest in Devonian formerly held by Gulf was relinquished to Devonian in return for a 25 per cent share of sales from its producing properties in Texas, New Mexico, and Oklahoma. This arrangement will be in effect until these remittances to Gulf reach $5,318,412 plus a sum equal to 4½ per cent a year on the unrealized balance.

At the same time Warren purchased from Gulf a subordinated note of Devonian for $4,750,000 plus interest.

Warren Petroleum estimates that payments to Gulf will be completed in about 5 years, based on present production and market prices. The 25 per cent interest will then revert to Devonian.

Plant Recovers From Fire

WASHINGTON.—Effects of the bad fire last September at Borger, Tex., butadiene plant have now been overcome and GR-S synthetic rubber production this month will be back on schedule at the projected rate of 760,000 tons a year.

Reconstruction Finance Corp. officials anticipate that December output will be at a somewhat higher rate.

With over 100,000,000 gal. of alcohol on hand or under commitment for the production of butadiene, a supply sufficient to meet requirements for the remainder of 1951 and for several months next year is assured, and no further purchases or commitments are being made for the synthetic-rubber program.

Government production for the year topped the 500,000-ton mark in September when output for the first 9 months reached 506,643 tons, well over double the 242,953 tons produced in the same 1950 period. In addition, private production of S-Type synthetic with 50 per cent or less styrene content amounted to 2,176 tons for the same period; no comparable figure for 1950 is available.

New Officers

A.P.I. picks chairman, vice president, nine directors

CHICAGO—A new chairman of the board, one new vice president, and nine new directors of the American Petroleum Institute were elected during the thirty-first annual meeting of the Institute here.

L. S. Wescoat, president of Pure Oil Co., Chicago, was named board chairman to succeed W. Alton Jones, president of Cities Service Co., New York, who is completing his second 1-year term. *(A biographical sketch of Wescoat appears on page 127.)*

Frank M. Porter, president of Fain-Porter Drilling Co., Oklahoma City, was reelected president of the Institute.

The new vice president is P. C. Spencer, president of Sinclair Oil Corp., who was named to succeed T. E. Swigart, of Shell Pipe Line Corp., Houston, as head of the Division of Transportation.

New directors include R. L. Tollett, Cosden Petroleum Corp., Big Spring, Tex., refining; O. F. Moore, Ohio Oil Co., Findlay, pipe lines; B. C. Graves, Union Tank Car Co., Chicago, tank cars; Mason Jones, S. M. Jones Co., Toledo, Fred Murray, Oil Well Supply Co., Dallas, and George O'Leary, Houston Oilfield Materials Co., Houston, all in the supply group; Charles S. Hill, Denver, production; Harry Moreland, Great Lakes Pipe Line Co., Kansas City, pipe lines; and Ray E. Miller, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., director at large.

Hill, Moreland, and Miller fill new directorates created during the annual meeting.

Industry Briefs

VENTURA, Calif.—A 29-acre tract near Ventura Avenue field has been selected by Shell Chemical Corp. as the site for building its recently announced multimillion-dollar ammonia plant. The plant, scheduled for completion in mid-1953, will produce 150 tons of anhydrous ammonia daily.

LOS ANGELES.—General Petroleum Corp. is planning the addition of a large catalytic cracking unit at its 120,000-bbl. Torrance refinery near here. While details have not been announced it is understood the new unit will cost in the neighborhood of $8,000,000.

WASHINGTON.—Rear Adm. Burton B. Biggs will leave his post as chief of the office of petroleum programs of the Munitions Board for sea duty January 1 and will be succeeded by Brig. Gen. Alfred H. Johnson. Johnson will also take over other duties from Biggs, including his post as chairman and executive secretary of the Joint Petroleum Committee.

WASHINGTON.—Osgood V. Tracy, of Short Hills, N. J., on leave as general manager of the chemical-products department of Esso Standard Oil Co., has been appointed director of the National Production Authority's chemical division. Jack W. Askins, of Dallas, formerly representative of oilfield equipment manufacturers, has been named deputy director of the materials division in the Office of Civilian Requirements of NPA.

LOS ANGELES.—Union Oil Co. has been granted permission by the California Fish and Game Commission to engage in offshore seismic operations, the first such work permitted in more than 2 years. Union will represent Shell Oil Co. and Continental Oil Co. in the work, which will be conducted between Carpenteria and Capistrano Beach. Black-powder charges will be used in order to reduce fish kills. *(See The Oil and Gas Journal, August 2, page 40.)*

WASHINGTON.—Orville D. Judd, for the past year head of petroleum pricing in the Office of Price Stabilization, has resigned effective November 30 to join the Sinclair Refining Co. as assistant to the vice president in charge of sales. Judd will maintain offices in Washington.

LOS ANGELES.—Richfield Oil Corp. has purchased a 5-story building on Wilshire Blvd. for the purpose of transferring the headquarters of its southern division there. Consideration was reported to be in excess of $1,500,000.

NPC Ends Year

Council winds up 1951 activity with six reports valued at $300,000; Chapman pleased, won't name new chairman

WASHINGTON.—When the National Petroleum Council meets again—in 1952—it will still be operating under an industry chairman and will be able to look back on a 1951 record which "eminently satisfied" the man it set out to advise, Secretary of the Interior Oscar Chapman.

At its final meeting of 1951 here, the council was highly lauded by Chapman, who said he will pay no attention to the recommendations made the week before by the House antimonopoly subcommittee that the NPC be put under a government chairman.

At the meeting the council submitted six reports representing work estimated to cost in excess of $300,000 without a cent of expense to the Government.

As one of its actions before adjourning for the year, the council adopted a resolution authorizing it to serve as an advisory body to the Petroleum Administration for Defense as well as to the Oil and Gas Division, the agency with which it originally was set up to work with.

To make study.—The council agreed to make a study for the department to determine the most desirable range of sizes and weights of oil-country tubular goods for present production needs and the relative proportion of each expressed in terms of footage and tonnage.

In requesting the study, Hugh A. Stewart, acting director of the OGD, pointed out that the present almost universal use of rotary rigs and deeper drilling result in a need for relatively greater quantities of smaller sizes of casing, and the maintenance by the mills of production patterns based on cable-tool drilling and shallower wells has created unbalance between supplies of small sizes and large-diameter casing.

Since it is essential to the defense program that maximum utilization of available steel be secured, Stewart said, PAD is anxious to obtain information on which to formulate recommendations to the pipe mills as to the most desirable production patterns.

Analysis request denied.—A request for an analysis of the steps necessary to effect overland movement of crude and products to the East Coast in the event that water-borne transportation is completely or partially disrupted was denied by the council, however, on the ground it would involve the development of plans and programs and recommendations for the handling of competitive problems which are considered beyond the proper scope of NPC action.

The request by Stewart pointed out that the problem of East Coast supply which was so difficult in the early days of the last war might recur in the event of some future emergency, and prudent defense planning requires the preparation of plans to meet any such eventuality.

Among the reports submitted by council committees was one on the availability and transportation and materials requirements of liquefied petroleum gas in which it was shown that availability next year will be 15.7 per cent greater than during corresponding periods in 1951, but demand is up some 20 per cent.

However, it was felt by the committee, headed by W. K. Warren of Warren Petroleum Corp., Tulsa, new plants which will come into operation next year should make up this deficiency around March if there is no difficulty in getting materials.

No surplus inventory.—Currently, the committee reported, there is no surplus inventory at manufacturers' plants or terminals, whereas last January there was something over 500,000 bbl. or the equivalent of about 2 days' supply. Increased demand for aviation gasoline, to which butanes have been diverted, was given as one cause for this situation.

The report said that pressure-tank-car construction has kept pace with the increased production of L.P.G.

The committee estimated that L.P.G. production next January will total 380,386,269 gal. as compared with 328,690,040 gal. in January 1951, consisting of 234,064,834 gal. of propane against 201,605,611 gal.; 108,198,907 gal. of butane against 88,040,114 gal. and 38,122,528 gal. of mixtures against 39,045,315 gal.

Domes for storage.—Salt beds and salt domes appear, on the basis of cost, dependability, and general availability, to be most practical for the creation of underground storage, it was reported by a committee headed by H. S. M. Burns of Shell Oil Co.

Artificial caverns can be created in these formations by circulating fresh water and withdrawing the saturated brine, the committee said in an interim report, and since they offer the greatest possibilities study will be concentrated on them initially, with other types of storage such as natural caverns, mines, and shale formations investigated later.

While it is impossible to estimate the total amount of storage that could be provided, from available information, the amount would be considerably in excess of the 100,000,000 bbl. envisioned by the department. An incomplete survey of salt-mining companies indicates that a considerable amount of storage might be made available by merely rehabilitating existing chambers, the committee said.

The committee estimated that underground storage of 100,000,000 bbl. would require .46 lb. of steel per bbl. as against 6 lb. for atmospheric and 110 lb. for pressure storage. The cost per barrel was estimated at 11 cents, as against $1.18 for atmospheric and $20 for pressure storage.

Quebracho.—A strong case against reduction in the use of quebracho by the oil industry was presented by a committee headed by John R. Suman of Standard Oil Co. (N. J.) in a report pointing out that while utilization of substitutes has increased from 960 tons in 1948 to 10,800 tons this year plant facilities for their production are inadequate and cannot be increased before mid-1952.

Consumption of quebracho in 1948 was 25,000 tons and this year will be in the neighborhood of 30,000 tons.

So long as quebracho is available in adequate supply in the world market and can be transported to this country, its use should not be restricted, particularly in view of the tremendously increased footage which is being drilled this year and will be drilled in 1952 and the greater need for quebracho in the deeper wells.

Facing problem. — "The oil industry will face a sufficiently difficult problem in operating with the purchase of supplies now permitted under Order M-57 without any further reduction in the amount of this material allowed to the industry," the committee commented.

"Moreover, as the industry is being called upon to increase its producing potential, the problem will become even more serious, and the use of quebracho by the oil industry should not be restricted . . . It is imperative that no action be taken which could endanger the ability of industry to readily meet the demand for petroleum and petroleum products required for the national-defense effort and the national economy."

For articles on the NPC's reports on the cost of providing an additional 1,000,000 bbl. of oil daily and on the proposed synthetic-fuels program, see The Oil and Gas Journal, November 8, pages 171 and 172.

Equipment Price Lid Eased

WASHINGTON. — Regulations under which manufacturers of equipment and machinery for the oil and gas industry will be able to take advantage of the Capehart amendment to the Defense Production Act have been issued by the Office of Price Stabilization.

The Capehart amendment provides that in the fixing of ceiling prices OPS shall recognize increases in costs occurring up to last July 26.

The OPS regulations do not provide for automatic adjustment of prices to meet the requirements of the legislation, but permit manufacturers to compute their increased costs and file applications for adjustment. Applications are to be transmitted by registered mail, and the new ceiling prices may be put into effect upon return of the registry receipt, subject to OPS review at a later date.

Ceiling Price Regulation 30, covering manufacturers of machinery, will become mandatory effective December 19. The regulation was suspended June 30 because of the controversy over the Capehart amendment, which was bitterly opposed by OPS. While manufacturers who had filed under the order were required to abide by it, those who had not filed were permitted to remain under the general freeze order of last January.

Steel-Plate Needs Up

WASHINGTON.—An increase of approximately 200,000 tons a quarter in the production of heavy plate steel will be required beginning with the first quarter next year if programs important to the defense effort are to be kept on schedule.

Plate shipments for this quarter will exceed the authorized production directives accepted by the mills, but a substantial tonnage of authorized controlled materials orders for current quarter delivery to important defense and related programs have not yet been placed.

Steel mill representatives meeting with National Production Authority officials to discuss the situation offered as a solution of the production problem the shifting of orders for lightweight plate to the strip mills. Officials agreed that this would be necessary next year, when the demand for heavy plate will be greater and less amounts of steel will go into the strip mills. Unless light plate production is thus shifted, they said, part of the available steel supply will not be used.

Industry men recommended that in the future the NPA should not include plate for the production of pipe in its plate-supply figures and should subtract the tonnage for pipe production before issuing allotments of plate.

WATCHING WASHINGTON

Bertram F. Linz

Tidelands Bypass

INTERIOR Department legal experts are studying ways by which the Texas-Louisiana tidelands can be put under development without action by Congress.

Three possible bases for administrative action bypassing Congress are currently under review. One is the law authorizing the President to set aside Naval petroleum reserves. A second possibility is invocation of provisions of the Defense Production Act designed to increase the output of critical materials and minerals, and a third is the Federal Property and Administrative Services Act of 1949, providing general authority for the management of federally owned property.

The issuance in September of a permit to Magnolia Petroleum Co. to drill a well in the Eugene Island area off the Louisiana coast, however, is of no significance as an indication of prospective extensive development. While not exactly an offset well, the company sought a permit on the ground it would tend to assure greater ultimate recovery, and a scientific study by the Geological Survey supported that contention, and the permit was granted.

Any executive order by the President designating one or more areas in the Gulf tidelands as naval petroleum reserves would make it possible for the Navy Department to undertake development, probably by contract with a major company and possibly requiring action by Congress. Application of either of the other two laws probably would involve the issuance of permits or leases and raise doubts among operators as to where they would stand if Congress finally quitclaimed the submerged lands.

Congress will not return until January 8, giving the department 2 months in which to move, if indeed it does move, but while the matter has been under study for many months there is nothing to indicate it is being steamed up at this time.

Transport Threat

Between 10 and 14 million of the 40 million privately owned automobiles now on the road would be immobilized in the event of war, it is indicated by a study of minimum wartime-transportation needs now under way in the Defense Transport Administration.

About 26 million cars would be required to provide absolutely essential service and 30 million would be needed to do transportation work comparable to that performed by 25½ million during the last war.

Basic data show that 29 per cent of the country's automobiles are not used on an average day, and 10 per cent remain idle throughout a week. These cars, presumably, would be denied gasoline in the event of war, less, of course, those that would then be required to supplement mass-transportation facilities which would prove far from adequate.

With unnecessary cars off the roads, it is indicated that the gasoline consumption of the remaining automobiles could be reduced by 20 to 30 per cent. DTA officials do not believe it would be possible to repeat the action of the last war and eliminate automobile production entirely.

Break for Small Plants

If you run a petroleum refinery with not more than 500 hired hands you are a small businessman, but if you build locomotives with less than 2,500 employes you are still a small businessman.

Under a new concept of what constitutes "small business," the Department of Commerce has set up a new standard under which a small business may range from one with 100 or fewer employes to one with 2,500, depending for one thing, on the degree of concentration of output in the hands of the largest enterprises in each of the 452 industries which make up our productive economy.

The department's new standard differs violently with that set up by the Defense Department classifying as small business any establishments with less than 500 employes.

Since the Defense Production Act and certain procurement laws require that special efforts be made to safeguard the interests of small business, both with respect to the allocation of scarce materials and in distribution of purchase contracts, the department's flexible standard, which it will seek to have accepted generally is of considerable importance.

While there is no change in the classification of refineries, the smaller plants manufacturing oilfield machinery and tools may be in a better position in relation to larger competitors by the fixing of the line between large and small plants at 250 workers, for instance.

Radio Rules

A.P.I. wants them changed to help pipe-line industry

WASHINGTON. — Broadening of Federal Communications Commission regulations on radio service for the oil and gas industry is being pressed by the American Petroleum Institute central committee on radio facilities.

The committee has made representations to the commission that extended range for two-way point-to-mobile communications is necessary for the pipe-line industry, since operations are carried on on a "ribbon" basis along the right-of-way and maintenance crews often work out of range of the base station. The committee contended it would be more practical to set up an unattended relay station than to establish and man an intermediate base station.

Suggestions by the commission that the use of mobile frequencies for control purposes would discriminate in favor of those who could qualify for mobile relay stations as against users of conventional systems were held by the committee to be unfounded since users who could not qualify for mobile relay installations have no need for a mobile frequency to be used for control purposes.

Permits issued. — Construction permits have been issued by the FCC for 31 base stations, 120 mobile units, 3 control stations, and 5 relay stations, as follows:

Houston Pipe Line Co.: 2 base stations on 153.29 mc. near San Jacinto and Village Mills, Tex.; 50 mobile units on 153.29 mc. in southern Texas; 3 fixed control stations, operating on 75.98 mc. at Village Mills, 72.82 mc. at Houston, and 73.18 mc. also at Houston; 2 fixed relay stations on 75.98 and 75.66 mc. near San Jacinto, and 3 mobile relay stations on 153.29 mc. near Needville, Berclair, and Hardin, Tex.

Northern Natural Gas Co.: 58 additional mobile units on 33.18 mc. in Texas, Oklahoma, Kansas, Nebraska, South Dakota, Iowa, and Minnesota.

Continental Oil Co.: Base station on 33.38 mc. at Farmington, N. M.; a similar unit at temporary locations in northwestern New Mexico, southwestern Colorado, southeastern Utah and northeastern Arizona; and 5 additional mobile units, also on 33.38 mc.

The Texas Co.: 2 base stations at temporary locations in southern Louisiana on 48.94 mc. and 4 mobile units, on 153.05, 153.11, 153.17, 153.23, 153.29, and 153.35 mc., to operate throughout the United States.

Sohio Petroleum Co.: 25 base stations on 33.30 mc. at temporary locations in Texas.

Union Oil Co. of California: 3 additional mobile units on 48.66 mc. in southern Louisiana.

Oil Round Table Held

WASHINGTON.—Officials of the Arabian American Oil Co. and the Department of State met this week with business executives to discuss the current situation in the Middle East in one of a series of area conferences conducted by the Foreign Service Educational Foundation and Johns Hopkins University.

The Middle East oil situation was discussed by James Terry Duce, Aramco vice president, and Richard Funkhouser, petroleum specialist of the State Department, who joined with Col. William A. Eddy, consultant to Aramco; Denis A. Greenhill, first secretary of the British Embassy; Assistant Secretary of State George C. McGhee, and other officials in a subsequent panel discussion.

A series of conferences are held annually by the foundation to provide business executives and government officials with analyses of current international problems. A meeting next month will explore the situation in Southeast Asia, and early next year conferences will be held on the German and Latin American situations.

New Defense Orders

WASHINGTON.—The following orders have been issued by the National Production Authority:

Amended Dir. 2 to M-11, November 2: Canceling the 15 per cent reserve of output so producers may accept up to 100 per cent of their monthly authorized production in CMP orders.

NPA Reg. 6, November 5: Providing for transfer of ratings, quotas, and other NPA authorizations by companies selling their assets and obligations to new owners.

Amended Notice 1, November 7: Making changes in the list of materials and products subject to antihoarding provisions.

Amended Schedule 5 of M-80, November 8: Permitting the use of columbium and tantalum in additional products.

Revocation of M-40, November 8: Eliminating provisions for priorities for machine tool builders having pool orders.

Amendment to M-41, November 8: Placing a lid on machine tool shipments for unrated orders after February 1, 1952. This will ban introduction of new models of automobiles and other consumer equipment requiring machine tools.

M-41A, November 8: Limiting priority ratings to buy machine tools to companies operating at a government-authorized production rate higher than in the first quarter of 1951.

Amendment to M-69, November 9: Limiting sulfur inventories to a practicable working inventory but not more than a 25-days' supply.

More Lead Controls

WASHINGTON. — The National Production Authority will put imported lead under allocation control January 1 and will follow up with controls on lead scrap as soon as a workable system can be developed.

Domestic lead has been under distribution control since September 1, but lack of adequate information made quick regulation of imports impossible. The total lead supply is about evenly divided between new

New Plant

Union Oil Co.'s marine terminal and new 4,000-bbl. asphalt plant near Edmonds, Wash. The recently completed plant operates on crude from Santa Maria Valley, California, to produce a wide line of paving and cut-back asphalts and road oils. Except for two crude-oil tanks, all storage in the background is for refined products brought in from the company's Oleum, Calif., refinery. Gasoline and diesel cuts from the asphalt plant are further processed in either the Oleum or Wilmington refineries.

domestic lead, imported lead, and scrap.

Because of the lack of control over imports, the manufacturers of tetraethyl lead were able to supplement their badly cut allocations of domestic metal this fall by extensive purchases abroad. In addition to TEL, principal users of lead are the storage-battery, electric-cable, and paint manufacturers.

Scarce Items Multiply

WASHINGTON.—Thiokol-polymers, sulfur, sulfuric acid, gas cylinders, and steel shipping drums are among approximately 100 materials and products added by the National Production Authority to its list of scarce materials and products subject to the antihoarding provisions of the Defense Production Act.

As a result of more plentiful supplies, however, benzene, crude and refined glycerin, ethyl alcohol, Portland cement, and certain other building materials have been removed from the list. Benzene and glycerin will remain subject to the inventory restrictions of NPA Regulation 1.

Materials listed by the NPA as in scarce supply are subject to both the antihoarding provisions and the NPA inventory controls. Under the former, no person may accumulate a supply of designated materials in excess of his "reasonable demands" or for the purpose of resale at prices in excess of prevailing market prices.

WEST COAST

Alaskan Search

Navy gets recommendation for program through 1953

DENVER.—A program for further exploration of Naval Petroleum Reserve No. 4 (Alaska) during 1952 and 1953 has been recommended to the Secretary of the Navy by a committee appointed to study the area's possibilities.

The committee met here November 5-8 to hear testimony of personnel engaged in the exploration work and to review results of the search so far.

Capt. Robert H. Meade, director of Naval Petroleum Reserves and a member of the committee, said the group confirmed the existence of an oil field at Umiat on the Colville River and the "widespread" existence of gas within the reserve. Meade said the committee also verified the existence of "many untested prospects."

Umiat field is roughly estimated to contain between 30 and 100 million barrels within its presently known limits, but exact size cannot be determined on the basis of present knowledge, Meade said.

The field lies north of the Brooks Range about 350 miles northwest of Fairbanks and 180 miles south of Barrow, northernmost tip of the continent. It is judged to be about 2 miles wide and 40 miles long. Oil was encountered at 250 ft. at the shallowest depth and 800 ft. at the deepest.

Other members of the committee, in addition to Meade, were Walter A. English, chief technical advisor to the director of Naval Petroleum Reserves for the Alaskan operation; Lewis W. MacNaughton, DeGolyer & MacNaughton; Dr. John C. Reed, alternate for the director of the U. S. Geological Survey; Comdr. A. C. Morris, Bureau of Yards and Docks.

Plans changed.—It is expected, on the basis of the committee's recommendations, that the Secretary of the Navy will ask Congress for a further appropriation.

The regular Navy Department bill carried no funds for continuing the exploration past the end of the current year due to testimony given by Meade before the appropriations committee that the exploration program might be dropped a year early because of materials shortages and the national emergency. *(The Oil and Gas Journal, August 9, page 58).*

This decision was changed after receipt of reports from industry advisers assisting in the Alaskan exploration work. Upshot of several conferences was a decision to continue exploration on a year-to-year basis. *(The Oil and Gas Journal, August 23, page 100).*

Teapot Dome test.—While the committee meeting was getting under way, Comdr. M. V. Carson, deputy director of Naval Petroleum Reserves, announced a deep test will be drilled soon on Teapot Dome (Naval Petroleum Reserve No. 3).

The test is planned for granite at an estimated 7,000 ft. It is scheduled to test indicated oil deposits at greater depths to determine how much total oil is in the reserve. The test hole will not be produced.

Gas Organization Eyed

LOS ANGELES.—California Public Utilities Commission has ordered an investigation to determine whether Pacific Lighting Corp. and Pacific Lighting Gas Supply Co. are subject to its regulations.

Pacific Lighting Gas Supply is an affiliate of Pacific Lighting Corp. which also owns all the stock in Southern California Gas Co. and Southern Counties Gas Co.

The inquiry stems from evidence disclosed during a recent rate hearing involving the latter two companies, according to the commission. It will delve into rates, rentals, services, operations, classifications, contracts, etc., of the parent firm and its subsidiaries.

Long Beach to Fight Back

LONG BEACH, Calif.—A publicity agency has been hired by the Long Beach Harbor Commission to compete with "tidelands propaganda" which receives wide circulation throughout the nation by agents of the Government, the commission reported here last week.

The public-relations representative, who will employ a full-time writer and researcher, will be William D. McAdam, of Washington, D. C.

The commission's action followed conferences with state officials both here and in Texas and Louisiana.

Much of Long Beach oil field lies within the tidelands boundaries, and millions of dollars have been tied up pending final determination of ownership of offshore resources.

ROCKY MOUNTAIN

Field Revived

Flowing well gives new life to Greasewood pool

DENVER.—The Greasewood oil field of eastern Weld County, one of the earliest oil field developments in the Denver-Julesburg basin, was revived last week with completion of a flowing oil well 1½ miles due north of the old field.

J. G. Dyer, Denver, and Gifford C. Parker, Parker Drilling Co., Tulsa, 2 Kirchof, C SE NW 12-6n-61w, flowed 73½ bbl. of oil the first hour and 45 bbl. of oil during the third hour. When the well was placed on a ¼-in. choke, it gaged 8 bbl. of oil and no water per hour. Gravity is 42° A.P.I.

The first sand, topped at 6,748 ft., has been called the Greasewood sand; some geologists call it the "D" while others consider it to be a stray sand lying above the "D" or Muddy sand. Total depth is 6,800 ft.

Discovered in 1930.—Greasewood field was discovered October 10, 1930, by Platte Valley Petroleum Corp. 1 Patterson, NE SE NW 24-6n-61w, which was completed for about 180 bbl. of oil per day from the "Greasewood" sand, penetrated to 6,607 ft.

In all, five oil wells were drilled along a north-south line on a spacing pattern of 40 acres per well. The peak of oil production was reached the following year when 177,920 bbl. were produced. However, output of the wells declined rapidly and three of the wells were abandoned. Cumulative production from the field was

534,530 bbl. to January 1, 1951, or an average of 106,906 bbl. per well.

Stratigraphic trap.—Variation in the stratigraphy is partly responsible for accumulation of oil at Greasewood. However, the wedge edge of the reservoir occurs downdip from the accumulation and the Muddy sandstone carries updip far beyond the pool. The Niles fault, a north-northwest trending structural barrier which parallels the township line east of the field, limits production in that direction.

Reservoir rock is a thin-bedded gray sandstone, in places quartzitic with interbedded, marine black shale.

ECONOMICS

Oil's Scope Widening

New demand patterns to make oil markets subject to quick change; long-term outlook getting better, economist says

NEW YORK.—The shift of the oil industry from a predominantly gasoline business to a supplier of "diversified energy," with major emphasis on burning oils, will tend to make petroleum markets less stable, Dr. Courtney C. Brown, Standard Oil Co. (N.J.) economist, said here last week.

Dr. Brown, who is now assistant to the chairman of the board of the company, told the eastern regional meeting of the Society of Security Analysts that greater seasonal peak loads, uncertainties of weather, the unpredictable behavior of unreported secondary inventories, greater sensitivity to general business change and the competition of other fuels will join to make oil demands of the future more subject to unexpected change.

Third phase.—The present period of increasing emphasis on the production of light burning oil constitutes a third phase in the development of the oil market. The first was the kerosine era when gasoline itself was a by-product. The second, Dr. Brown said, was the period through the 1930's when gasoline was the backbone of the market.

The higher peak demand in the industry occurs in the winter, and this trend is becoming more marked. Demands now average about 500,000 bbl. daily more, or nearly 10 per cent, during a normal winter than during the preceding summer. A great deal of money has gone into catalytic cracking equipment which has lowered residual yields but has not increased gasoline yields. Between 1946 and 1950, the yield of gasoline was 2.7 per cent lower than during the period 1931-35, but the middle-distillate yield was up 8.4 per cent.

Seasonal fluctuation.—One of the difficulties in this new type oil market is its much-greater seasonal fluctuation. Government controls have taken away the normal price flexibility which brings adjusted winter and summer yields, leaving the heavier winter demands to be met by increased storage and by higher year-round productive capacity.

Information regarding the level of consumer stocks of petroleum is scanty, but it is believed normal seasonal variations may amount to some 25,000,000 bbl. The frequent departures from the normal fluctuations provide the industry with a major problem. Uncertainties of weather also are making forecasting more difficult. Dr. Brown said a 5 per cent warmer or colder winter could make a difference of some 200,000 bbl. daily in oil demand.

Such statistical evidence as has been developed begins to suggest that the demands made against the industry will in the future be somewhat more responsive to changes in the general level of business. This would be expected, Dr. Brown said, since apart from heating, the nontransportation uses for petroleum tend to expand or contract with business activity, and even some of the marginal motor-car driving may be more affected in the future.

Long-term outlook.—As a transportation fuel, oil has pretty much the run of the market but with its new and expanding stationary uses, it is in competition with other energy sources some of which, such as natural gas, are as convenient as liquid fuel.

Dr. Brown pointed out that the practice of selling gas on an interruptible basis with peak shaving in the winter and dumping in the summer makes the petroleum market even more seasonal. He mentioned that the additional gas scheduled to arrive in the eastern and midwestern areas over the next few years is equivalent to about 300,000 bbl. of oil per day.

The long-term growth potentialities of the petroleum industry under the new pattern of demand are even better than they were when oil was primarily a transportation fuel, Dr. Brown said. In 1950, transportation use of energy was less than 25 per cent of the total. Highway use was only about 12 per cent. Heating, the firing of boilers, or other industrial uses made up better than 75 per cent of the total.

Shipments Drop

September imports, exports both below level of August

BOTH imports and exports of crude and products decreased slightly in September, according to data released by the Department of Commerce.

Total imports averaged 720,000 bbl. daily in September, a decrease of 25,000 bbl. daily from August. Crude was off 18,000 bbl. daily, and product imports were down 7,000 bbl. daily.

Crude receipts from Venezuela decreased about 32,000 bbl. daily, but part of this loss was covered by a gain of 19,000 bbl. daily from Colombia. Also, the decrease for Kuwait was greater than the gain for Saudi Arabia to give a net loss in crude from the Middle East.

Imports of residual fuel decreased 20,000 bbl. daily. However, the actual loss for heavy fuel was less than 20,000 bbl. daily since unfinished oils and topped crude, listed under other oils but including mostly low-gravity material, gained 10,000 bbl. daily.

Total exports, excluding shipments to territories, averaged 516,000 bbl. daily compared with 523,000 bbl. daily in August and 463,000 bbl. daily in July. The only important shifts for the month were in the liftings of kerosine and distillate fuels. Kerosine exports were up 12,000 bbl. daily in contrast with a decrease of almost 18,000 bbl. daily for distillate.

IMPORTS INTO CONTINENTAL UNITED STATES
(Thousands of barrels)

	Sept. 1951	Aug. 1951	Sept. 1950
Crude—			
Mexico	1,145	1,187	1,065
Colombia	1,752	1,218	1,448
Venezuela	7,511	8,767	9,232
Kuwait	1,990	2,278	2,488
Saudi Arabia	1,485	1,482	863
Borneo	318	319	
Canada	75	46	
Total crude	14,276	15,297	15,096
Daily average	476	494	503
Products—			
Residual fuel	6,532	7,359	9,348
Other products	787	427	1,193
Total products	7,319	7,786	10,541
Daily average	244	251	351
Total all oils	21,595	23,083	25,637
Daily average	720	745	854

EXPORTS*
(Thousands of barrels)

	Sept. 1951	Aug. 1951	Sept. 1950
Crude	2,199	2,361	2,654
Gasoline	4,019	4,093	1,849
Kerosine	1,325	1,000	113
Distillate fuel	2,554	3,186	905
Residual fuel	2,962	3,005	802
Lube oils	1,546	1,520	1,281
Other products	875	1,052	801
Total all oils	15,480	16,217	8,405
Daily average	516	523	280

*Excludes shipments to territories

SOUTHWEST

More Oil for Scurry

Water-injection pressure-maintenance plan will yield an extra billion barrels of oil, current studies indicate

SNYDER, Tex.—Engineering studies indicate that an additional billion barrels of oil can be recovered from the Scurry County reef area if a proposed unitization and water-injection pressure-maintenance program is adopted by the operators.

Extensive laboratory and field pilot- plant experiments have been made. These indicate that application of the latest reservoir-engineering techniques early in the field's life will result in a new efficiency record in recovery of original oil in place from a gas-depletion-drive reservoir.

Information gathered by the Journal's Midland, Tex., editorial office is that the engineering studies and experimental work show the following results can be expected from a unitized pressure-maintenance operation:

1. Probable recovery of more than three times as much oil as would have been recovered from individual lease operations by conventional methods.

2. Possible recovery of most of this oil in a much shorter period of time than engineers first estimated. The Imperial Oil, Ltd., analyzer study of the Redwater reef oil field in Canada *(The Oil and Gas Journal, October 18, page 90, and October 25, page 111)* indicates a safe depletion rate of at least 6 per cent per year in that reservoir. If analyzer and other scientific studies of the Scurry County reef should check out in similar fashion, it would mean that about three-fourths of the recoverable oil could be produced within 20 years.

3. An even faster recovery than 6 per cent per year through a more intensive injection program using both water and natural gas. This possibility still is in the potential stage but is under consideration in spite of the increased cost.

Plan under study.—Operators are now studying what is believed to be the final draft of the unitization program. Two previous drafts were presented to the operators, and the third document is expected to settle all questions which arose earlier.

In the meantime, a dam 15 miles southwest of Snyder is about three-fourths completed. It is being constructed by Colorado River Municipal Water District, which has assured operators of an adequate water supply for flooding the reservoir for at least the first 20 years of the field's life.

Pipe has already been strung for a water system for the field. Owners of major wells in Kelly-Snyder and Diamond M fields have underwritten cost of the supply-water pipe line to the area. The line will be 27-in. in diameter through the field, and a 21-in. section will extend to Snyder. Operators will be allowed up to 200,000 bbl. of water daily for field operations.

The line will be equipped with four 8-in. and three 6-in. taps for addition of lateral systems at a later date.

Negotiations followed.—It is well known that the Texas Railroad Commission has been keeping in close touch with the engineering studies and is eager to see pressure restoration work started as quickly as possible.

It seems likely that both the Petroleum Administration for Defense and military circles in Washington are also watching the situation closely. Washington is known to be extremely interested in any projects that promise to increase both crude production and reserves, especially with a minimum use of steel. *(The Oil and Gas Journal, November 8, page 171.)*

The military authorities also are interested in anything that promises to permit faster reservoir-depletion rates with safety. Faster depletion would mean a substantial increase in allowable production at a low cost in terms of barrels of oil per ton of new steel required.

GULF COAST

Mississippi Strike

Seeps in old rank wildcat lead to new gas discovery

ABERDEEN, Miss.—Gas production in northeastern Mississippi was revived last week when a rank wildcat 8 miles southwest of this city came in blowing gas twice as high as the 90-ft. workover mast. The discovery is 22 miles southwest of the depleted Amory gas field.

The discovery is Malcolm N. McCaskill and Northeast Mississippi Oil Co., Inc., 1 J. T. Sanders, located 93 ft. from the south line and 176 ft. from the west line of 22-15s-6e, in Monroe County. The well blew in wild while crews were cleaning out an old "strat" test to 2,900 ft.

Last week end, service - company crews from Houston installed a blowout preventer and shut in the well. No gage has been reported on the flow. Although there was no oil, the gas is reported carrying some distillate.

Pennsylvanian pay? — The source of the gas is believed to be the Pennsylvanian gravels found at a depth of about 2,900 ft. Originally, the well was drilled to a total depth of 6,060 ft. in the Mississippian rocks by Carter Oil Co., which abandoned the well after running an electric log. Open hole was carried from 1,251 ft., where surface pipe was cemented. When the well was originally drilled, mud weighing 10 lb. per gallon was used, and no gas show was reported. However, the electric log is reported to indicate a sand body at the 2,900-ft. level.

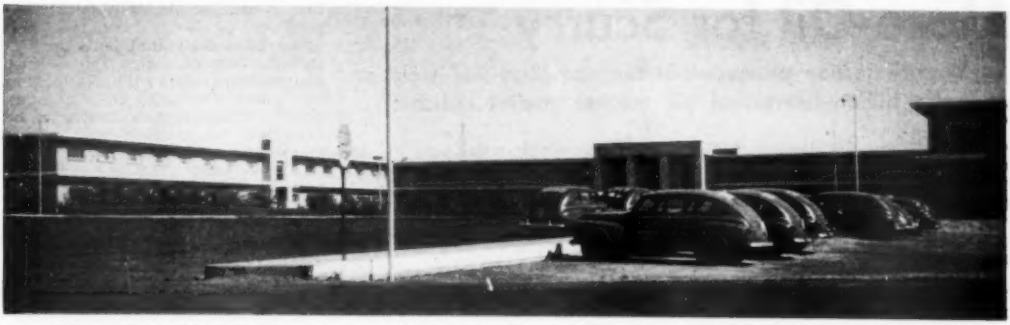
When the well was abandoned, Carter set a plug in the surface casing. Gas seeped around the plug and on the basis of the seeps, McCaskill leased a block of acreage around the well and moved in a workover mast. When the surface plug was removed, the well began to head and a Calseal plug was set in the bottom of the surface pipe until a well head could be installed. The hole was then cleaned out to approximately 2,900 ft., where the flow of gas was encountered.

Rank wildcat.—The discovery is situated 100 miles northeast of the nearest oil field, the Pickens area of Yazoo and Madison counties, and about the same distance north of Heidelberg oil field in Jasper County.

The nearby Amory gas field of Monroe County, which was discovered between 1926 and 1931, is now being used for underground-gas storage. Two weeks ago, Mississippi Gas Co., of Meridian, Miss. (subsidiary of Southern Natural Gas Co., of Birmingham. Ala.), commenced returning of gas to the 2,400-ft. Hartselle (Mississippian) gas reservoir through two old gas wells converted to injection. Southern Natural's pipe - line system extends to within 6 miles of the discovery well.

Structure.—Both the new gas discovery near Aberdeen and old Amory gas field are located near the southern end of the Cincinnati arch on a southwest - plunging structural terrace.

Formation markers. — Geological markers obtained from the electric log are as follows: Eutaw 180 ft., Tuscaloosa 460 ft., Pottsville (Pennsylvanian) 1,100 ft., Pennington 4,480 ft., Bangor (Mississippian) lime 4,855 ft., Hartselle sandstone 5,275 ft., Golconda, Cypress, Gasper, and Bethel interval from 5,515 to 6,025 ft., Tuscumbie 6,045 ft. Surface elevation is 280 ft.



ARAMCO HEADQUARTERS.—Above is the headquarters building of Arabian American Oil Co. at Dhahran, Saudi Arabia.

MIDDLE EAST

All Problems Not Oil

Aramco must house 22,000, import food and supplies from around the globe; water, civil obligations are worries, too

Dahl M. Duff

DHAHRAN, Saudi Arabia.—Some of Arabian American Oil Co.'s greatest problems are not connected with oil producing and shipping.

A large portion of its money and energies goes into the enormous task of providing for nearly 22,000 employes and families in an underdeveloped and climatically difficult part of the world.

Oil men here remark that at times Aramco seems to be engaged in everything but the oil business. Supporting activities are a major concern in nearly all foreign oil operations, but in Aramco's case they are magnified by the company's size, distance from the United States, necessity of using soft currencies, and the nature of the country itself.

Some figures:

For every dollar the company spends for oil facilities, roughly $1.20 goes for nonoil items.

For every employe directly connected with oil operations, another 1.17 are engaged in other types of work.

Of the company's shipments into Saudi Arabia, approximately 45 per cent by value are for nonoil requirements.

Dhahran, field headquarters for the company, is an American-style community with hundreds of homes, sidewalks, taxicabs, library, swimming pool, and modern motion-picture theater. The several other company centers in Saudi Arabia range on down to typical field camps with portable living units.

Air-conditioning is almost universal with Aramco construction. For the company homes and offices, there are more than 8,000 tons of air-conditioning equipment. Aramco's power requirements are drawn from 22,000-kw. capacity generators at Abqaiq and 18,000-kw. capacity at Ras Tanura.

Water supply is a considerable problem in itself because of the dangers of a decline in the water table. Dhahran requires about 40,000 gal. of distilled water daily, and 5,000,000 gal. of raw water. The community is served by 13 wells from 300 to 500 ft. in depth. The company is practicing and teaching water conservation. With Saudi Arabian Government approval an Arab-language film on this subject was produced and now is being shown.

INTERNATIONAL EDITOR.—Dahl M. Duff, the Journal's international editor, before the American guest house at one of Aramco's camps in Saudi Arabia. This is the seventh in a series of articles by Duff on Middle East oil operations. Other articles which he prepared while on his Middle East tour will appear in early issues of the Journal.

Despite Aramco's program to develop industries and services among the Arabs, the main burden of maintaining these communities still falls on the company. It operates recreation centers, laundries, bus lines, schools through the ninth grade, and hospitals, builds roads and houses, and caters to the individual needs of the 21 separate nationalities on its payroll. And, with very few exceptions, supplies to accomplish this must all be imported.

Eastern Saudi Arabia—which before the advent of Aramco was desert wasteland with a sprinkling of Arab villages—is some 9,000 miles by boat from the East Coast of the United States and about two-thirds that distance from Western Europe. The company's logistics problem has been described as the greatest faced by any organization aside from the military establishment.

Many countries of the non-Communist world provide supplies to Aramco. To mention only a few, meat is bought in Australia, beer comes from Denmark, vegetables from Lebanon, and electrical equipment from England. Even with the necessity of using the soft currencies for which its oil is sold, Aramco must take a large and irreducible volume of supplies from the United States, either because of preference of its employes or because they are not available elsewhere.

Housing problem. — Housing is a problem which has been complicated by the company's rapid growth. There are now approximately 1,000 homes for married men among the senior staff (virtually all of whom are Americans). Roughly half these are in Dhahran, and another third in Abqaiq. It is estimated at present that another 580 homes are needed

The three 24,000-bbl. Horton Double-Deck Floating Roof tanks shown above, a 6-ft. by 20-ft. separator, an elevated water tank, a 10,000-bbl. flat-bottom water tank and three Hortonspheroids are helping the Elk City, Oklahoma, crude oil and gas processing plant operated by Shell Oil Company obtain maximum production from the Elk City field.

These tanks store high gravity crude more efficiently because Horton Double-Deck Floating Roofs float directly on the liquid. As a result, filling losses are prevented, the fire hazard is cut down and corrosion on the underside of the roof is greatly reduced. Also instrumental in the efficient operation of Horton Double-Deck Floating Roofs is the improved Horton Seal that prevents the escape of vapor around the edge of the deck.

Take advantage of these important savings in your storage operation by writing our nearest office for information on Horton Double-Deck, Pontoon or Pan type floating roofs.

The Elk City plant, which is operated by Shell Oil Company for the nine operators and over 500 royalty owners in the Elk City field, is processing 15,000 bbls. of crude oil per day and recovering 225,000-gals. of natural gasoline and butane mixture and 55,000-gals. of propane per day. Unitization of the field is employed to assure maximum production and efficiency.

CHICAGO BRIDGE & IRON COMPANY

Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY and GREENVILLE, PENNSYLVANIA

Atlanta, 3.....2154 Healey Bldg.
Birmingham, 1.....1536 North 50th St.
Boston, 10.....1025-201 Devonshire St.
Chicago, 4.....2128 McCormick Bldg.
Cleveland, 15.....2204 Guildhall Bldg.
Detroit, 26.....1514 Lafayette Bldg.
Houston, 2.....2119 National Standard Bldg.
Los Angeles, 17.....1523 General Petroleum Bldg.
New York, 6.....3347—165 Broadway Bldg.
Philadelphia, 3.....1615—1700 Walnut Street Bldg.
Salt Lake City, 4.....525 West 17th South St.
San Francisco, 4.....1544—200 Bush St.
Seattle, 1.....1325 Henry Bldg.
Tulsa, 3.....1606 Hunt Bldg.
Washington 6, D. C.....1139 Calvitz Bldg.

REPRESENTATIVES AND LICENSEES

Horton Steel Works, Limited, Fort Erie, Ontario, Canada
Ateliers et Chantiers de la Seine Maritime, Paris, France
Constructions Metalliques de Provence, Arles-sur-Rhone, France
Chicago Bridge & Iron Company, Ltd., Apartado 1348, Caracas, Venezuela
Comprimo N.V., Amsterdam—O, Netherlands
Compagnia Tecnica Industrie Petroli, Rome, Italy
Whessoe, Limited, Darlington, England
Motherwell Bridge & Engineering Company, Limited, Motherwell, Scotland
Sociedade Chibridge de Construcoes Ltda., Av. Franklin Roosevelt, 194-S/704-C, Rio de Janeiro, Brazil

to give family quarters to all married men after their initial 2-year contract of employment.

During the next 2 years, the hope is to fill the housing requirements and to bring the family waiting period down to 1 year if possible.

In order to provide housing as quickly as possible, the company is now erecting 240 prefabricated frame units shipped from Sweden. These and other prefabricated houses are said to be adequate and satisfactory but the expectation is to return to permanent masonry construction next year.

Housing is probably the most important single factor in personnel relations in the type of operation conducted by Aramco. Turnover among Americans is about 2.3 per cent per month, but when married men are living with their families the turnover is negligible.

The company's long-range policy is to encourage the development of Saudi Arabia itself. By guaranteeing rents, providing building plans, and assisting with materials, it hopes to foster construction of rental homes for senior staff members and their families in nearby Arab Dammam. For the Saudi Arab employes, it has begun making loans to allow them to build their own homes through Saudi Arab contractors. Among other advantages, this program is a move away from the "company town" atmosphere.

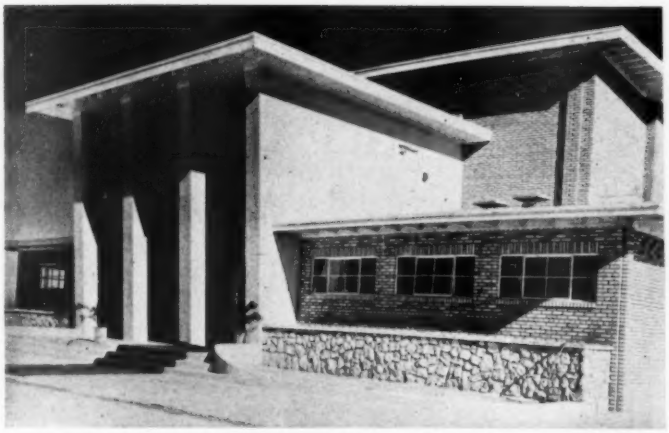
Personnel.—Aramco draws on Europe for a part of its manpower needs both because of the soft currency problem and the tight labor market in the United States.

It recently opened a small recruiting office in The Hague in the Netherlands and hired several Dutch engineers and physicians. There are about 800 Italian employes, many of whom are craftsmen. Approximately 900 Palestinian Arab refugees have been employed in the last 2 years and are used particularly in clerical capacities.

Under its concession obligations, the company is committed to the ultimate goal of having only Saudi Arab and American employes. Consequently Saudi Arab nationals are being trained and brought into the operation wherever possible.

Aramco's own employes in Saudi Arabia number slightly more than 19,000, according to a recent report. Of these, about 2,780 are American. Dependents of these senior staff members total 1,758, including 942 wives and 816 children. In addition, the service companies, the railroad project, and the agricultural farms account for about 570 more Americans.

Food.—The food required quarterly for these American employes includes such quantities as 495,000 lb. of fresh frozen meats, 60,000 lb. of powdered milk, 55,000 lb. of butter, and 39,000 lb. of ice-cream mix. The dollar sales volume of the company's family food stores approximately $420,000 quarterly; that of the canteens, $135,000 quarterly.



MODERN THEATER IN RAS TANURA.—Personnel at Ras Tanura, refinery headquarters for Arabian American Oil Co. in Saudi Arabia, see their movies in this modern theater—as comfortable as any to be found in the United States. Jutting plastered pylons of the Egyptian style mark the entrance. The movie house, built on desert sand, is only a few hundred feet from the water of the Persian Gulf. An open-air bowl equipped with projection machines for outdoor showings is built into the west facade of the building.

The company's national employes are given a food issue every 2 weeks which is subsidized 50 per cent by the company. Among other commodities, this requires, quarterly, 1,441,625 lb. of rice, 500,000 lb. of sugar, 50,000 lb. of tea, and 65,000 lb. of salt. In addition, the company provides its national employes one hot meal daily which is subsidized 75 per cent. Items required for a daily 22-oz. meal for 10,000 national employes over a 3-month period include 92,500 lb. of bread, 100,000 lb. of mutton, and 197,500 lb. of rice.

Aramco seeks to keep on hand a 3-month supply of food, and a 6-month supply of critical items. Forward ordering is from 9 months to a year, allowing for delivery, shipping, and stocking after arrival. Perishable foods are, of course, handled more quickly.

Inevitably, in an undertaking of this magnitude, and under conditions prevailing at present, shortages develop. The company operates a fleet of more than 2,000 automobiles and trucks. About 200 were immobilized for a time because of lack of tires (Aramco vehicles use a special oversized sand tire) but the tires since have arrived and the vehicles are back in operation.

The railroad.—Among the company's varied nonoil assignments was the construction of the only railroad presently operating in Saudi Arabi.

This project is a story in itself. Originally conceived as a relatively short line to serve the oil operation, it was broadened into a $52,500,000, 345-mile project and built on behalf of the Saudi Arabian Government against the royalty account.

At Dammam, the railroad is connected to a new pier which extends 6.8 miles into the Persian Gulf over causeway and trestle. The line, completed last month, extends from Dammam to Riyadh, serving Abqaiq, the area of the new Uthmaniyah field and various Saudi Arabian centers.

Crude Posting Revised

Socony-Vacuum Oil Co., Inc., has revised its Middle East crude-oil price posting to reflect the currently higher gravity of production from Qatar.

Socony-Vacuum's new schedule, effective November 1, shows a gravity of 39° to 39.9° for Qatar crude at the terminal at Umm Said, giving a price of $1.81, as contrasted to the previous posting which listed 37° to 37.9° gravity and a price of $1.77.

Other f.o.b. prices for crude in the Middle East remain unchanged—$1.75 for 36° to 36.9° gravity Saudi Arabian crude at Ras Tanura, and $2.41 for the same gravity Iraqi and Saudi Arabian oil on the Eastern Mediterranean at Tripoli and Sidon.

Socony-Vacuum is the only company publicly posting its prices for Middle East crude. It has an 11.75 per cent interest in Iraq Petroleum Co., Ltd., which controls the Qatar production. In Qatar, the present drilling program in Dunkan field is aimed at production from the No. 4 zone, which yields somewhat higher gravity crude. Many of the present 20 producing wells are completed into the lower gravity No. 3 zone; two rigs are now running in the field.

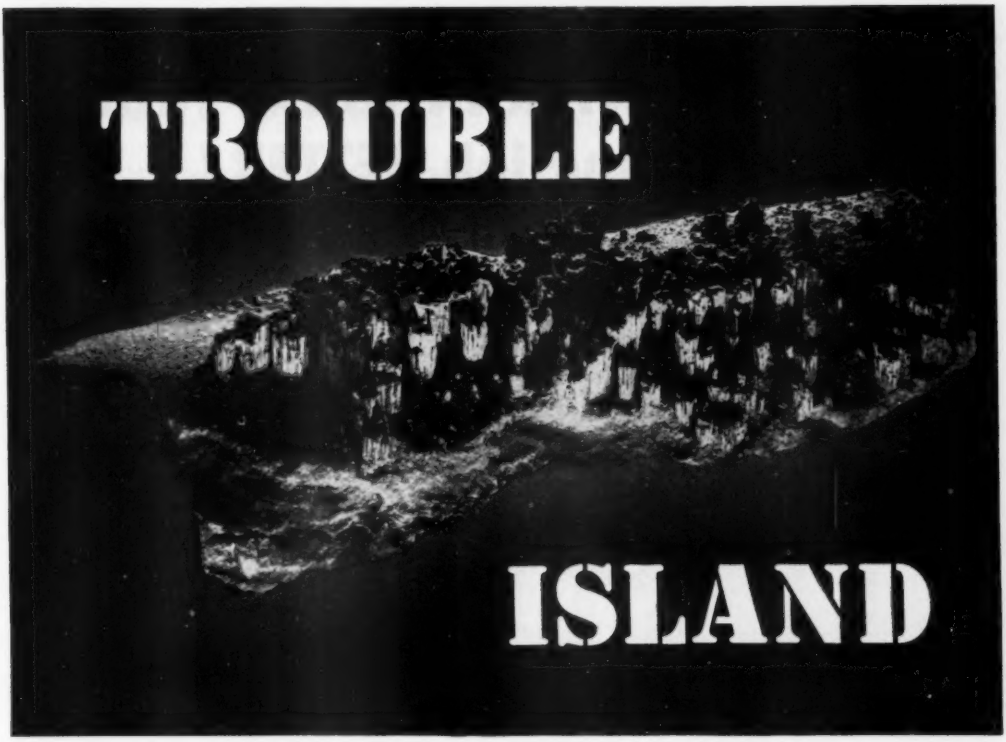


Photo is of a condenser-tube scale sample, about eight inches long. Solid scale is approximately ¼-inch thick, with "spires" ranging up to ⅜-inch height.

FIFTEEN years ago, this small island of trouble was part of a much larger open-box condenser problem at a refinery. Cooling water, running over 200°F. at outlet, contained 30 grains per gallon hardness and 20 parts per million iron. Tubes scaled heavily and rapidly without chemical inhibitor. Even with the best inhibitor then known, results were as illustrated above: partial inhibiting action creating the "spires" or forest-like deposits on tubes.

Considering this a challenge, Nalco sent a Doctor of Physical Chemistry — an expert water technologist — to the refinery. His weeks of work on the spot led to basically different treatment with new chemicals which cleaned up the condenser and kept it clean. Further Nalco research and development of chemical inhibitors has since enabled cooling systems to operate without scale or corrosion *with water hardnesses as high as 200 grains per gallon.*

Point is this: neither Nalco nor anyone else had an answer to scaling in that condenser. Nalco put the necessary brains to practical use and *got results* . . . benefiting, in the long run, not only that particular refinery, but every user of cooling water.

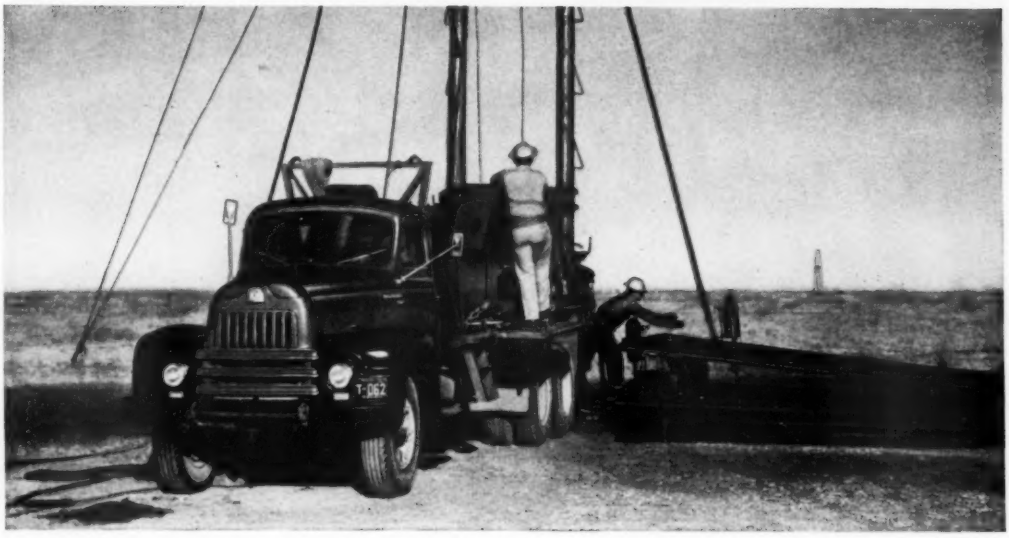
Whether your water treatment problem is unique, or stubborn plant-run, you will get prompt, decisive action from Nalco in the direction of positive results. Write or telephone today.

NATIONAL ALUMINATE CORPORATION
6242 W. 66th Place • Chicago 38, Illinois
Canadian inquiries should be addressed to
Alchem Limited, Burlington, Ontario

THE *Nalco* SYSTEM . . . Serving Industry through Practical Applied Science

A point we'd like to "drill" home:

There's an INTERNATIONAL TRUCK to do the job BETTER!



In the oil fields, or any place else where a truck is needed, invariably there's an International to handle the job more efficiently. This is easy to understand when you remember that:

1. Internationals are specialized for the job! Start with 115 basic models, add thousands of specialized variations. The answer is obvious: You get a truck perfectly adapted to the job, consequently, a truck that does it better. You choose from America's most complete line of trucks.

2. Internationals mean longer truck life! International Trucks have the ruggedness and stamina to stand up on the toughest jobs. You get longer truck life and the kind of performance that means lower operating and maintenance costs.

Here's proof of that statement: International Trucks have been *first* in heavy-duty truck sales for 19 straight years!

3. Internationals give you these outstanding truck features! Great new valve-in-head engines, roomy **COMFO-VISION CABS,** easy steering, and super-maneuverability are just some of these features. They add up to better work from drivers, bigger profits for owners.

Make a feature-by-feature comparison of an International with any other make of truck. You'll learn why an International is the smartest truck investment you can make.

Do it now. For that new truck, go first to your International Truck Dealer or Branch. You won't have to go any farther.

International Harvester Builds McCormick Farm Equipment and Farmall Tractors . . . Motor Trucks . . . Industrial Power . . . Refrigerators and Freezers

INTERNATIONAL HARVESTER COMPANY · CHICAGO

INTERNATIONAL TRUCKS

"Standard of the Highway"

Talks Cause Concern

PAD, industry left out in Washington negotiations with Iran's Mossadegh; other oil concessions seen endangered

Dahl M. Duff

THE trend of current negotiations in Washington with Iranian Premier Mossadegh is giving the oil industry ample cause for concern.

Reports from the capital fail to show that the State Department is consulting with either the Petroleum Administration for Defense or the industry in its latest attempts to find a settlement formula to the nationalization issue.

Industry circles believe that other important foreign-oil concessions will be endangered seriously if the Iranians are able to accomplish their nationalization program with any considerable degree of success. The long-term security of these operations is undermined if future governments elsewhere are encouraged to abrogate valid contracts made in good faith.

British Government officials appear to be resisting stoutly suggestions that they accept a settlement which could hardly be interpreted as anything but a victory for Premier Mossadegh. United States officials, on the other hand, apparently are much more willing to make concessions, feeling that an agreement which will keep Iran out of Communist hands is worth the price.

No Iranian change.—So far there has been nothing to indicate that Premier Mossadegh has budged at all from his unyielding stand. All along, he has insisted there were only three points open to negotiation: Compensation for Britain, oil sales for British needs, and the matter of obtaining technicians. In fact, the Iranian position seems somewhat more adamant than it was last summer when B. R. Jackson of Anglo-Iranian Oil Co., Ltd., and later W. Averill Harriman visited Teheran.

Latest reports out of Washington said that the Iranian leader was willing to sell 70 per cent of the concession's production to the Western nations at a discount, reserving 30 per cent for sales by Iran to other buyers on the open market. Another report said 10,000,000 tons, which would be about 30 per cent of the company's former production, would be made available to Britain.

Virtually nothing has been said by the officials participating in the Washington huddle. However, there was evidence to indicate that keeping Iran from Communism is regarded as more of a consideration than the stability of foreign investments, including those of the petroleum industry.

Recurrence feared.—Only last week another warning on the world-wide implications of what has happened in Iran came from George A. Sloan, chairman of the United States Council of the International Chamber of Commerce. He said there is little use to talk of increasing the flow of private capital to underdeveloped countries if the Iranian oil situation is apt to recur. Ironically, this program of greater private investment abroad is a State Department aim under the Point 4 plan.

A fundamental difference in opinion between British and United States officials was said to have resulted from the divergent views of just how great a threat Communism is in Iran if an oil settlement is not reached. Both British and American officials apparently agree that Premier Mossadegh's government cannot last in the absence of an oil settlement and in view of the tightening economic situation in the country. The British, however, feel that there is a chance the successor government might be more willing to make an agreement on workable terms.

Last week, it was reported that Anthony Eden, new British foreign secretary, had rejected a suggested settlement formula worked out in Washington and conveyed to him by Secretary of State Acheson in Paris. This was denied in Washington, but it gave further indications that the British are not ready to accept an unfavorable settlement simply to ease a possibly dangerous political situation.

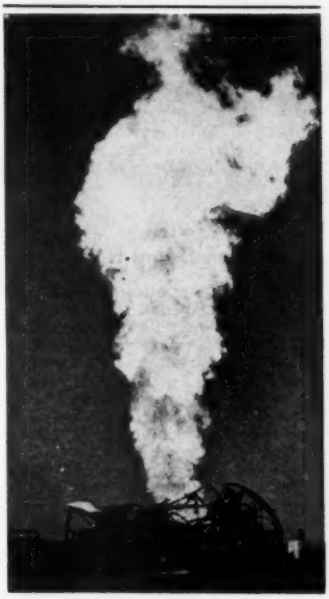
Economic trouble.—In Teheran, Shah Mohammed Reza Pahlevi, the Iranian monarch, was said to have cabled Premier Mossadegh asking that he return to the country as soon as possible. The reason was Iran's growing economic difficulties which have caused the reported expenditure so far of two-thirds of the £12,500,000 reserves which Iran withdrew from the Bank of England 3 months ago. Sources in Teheran said Iran had drawn down $11,000,000 of the country's $130,000,000 gold reserve to pay the former Anglo-Iranian employes.

There seemed to be less and less prospect that the premier would return to his country with a settlement. Estimates of how long his government will be able to hang on as a result vary up to almost a year. The British appear to feel that the best policy at present is to let Iran "wither on the vine," or at least wait for the possibility of a new government which would be willing to go part-way in negotiations.

Unit reactivated.—The Teheran radio announced last week that one distillation unit had been placed in operation at Abadan November 5. This was the first resumption of any refining activity at Abadan since the British closed down the plant July 31, after storage filled and exports were halted by the Iranian Government.

The information said National Iranian Oil Co. started up the unit and that it would be able to produce at its 3,000,000-ton capacity (about 60,000 bbl. daily) for about a month before storage made available by withdrawals for domestic consumption is again filled. The executive board of N.I.O.C. said that if ways to sell the oil could be found, the proceeds off the production of the one unit would be sufficient to meet refinery expenses.

Market salvation.—In this country, among market analysts, it is being increasingly recognized that the recent heavy exports from the United States resulting from British purchases to replace the Iranian deficit have in all



Rhine Gasser Afire

An unexpected gas-yielding formation encountered at a depth of 2,953 ft. resulted in this blowout on Gewerkschaft Elwerath Wolfskehlen 1, 7 miles west of Darmstadt, in the Upper Rhine Valley of Germany. Catching fire as tools were blown from the hole, the well blazed for 4 days before cratering extinguished the flame. After crew regained control by putting a flange and valve on the well head, debris of the derrick was removed and 5,000 sacks of cement pumped down the hole. The shallowest expected pay in the area previously was 4,922 ft.

probability prevented a general weakening of the products market. The 55,000,000 bbl. lifted or contracted by the British was a major factor in averting burdensome American oil stocks which would have reacted adversely on the market.

Along the same line, the feeling is that resumption of production and refining of a large scale in Iran would quickly create conditions of oversupply. Substitute producing and refining arrangements have been brought into force, and many of these are taking on a more or less permanent nature.

Because of the rapidly deteriorating foreign-exchange position of Britain, the treasury in London is under the urgent necessity of curtailing the emergency dollar-oil purchases in this country as soon as possible. So far, the purchasing agency in this country is taking virtually all oil offered. Considering market and stock conditions, its position is improving on all products.

Even without a settlement in Iran, these American purchases will taper off as sterling oil is gradually brought into balance with demand. In view of the British dollar-exchange position, this has raised fears of a new "substitution" policy dictated by the shortage of dollar currency. The possibility that this might arise the latter part of next year is being carefully studied in the American industry.

Mossadegh Going Home

Iranian Premier Mohammed Mossadegh has completed his talks in Washington and will return to Iran this week according to an official Iranian government announcement in Teheran.

Neither Mossadegh nor United States Government officials in Washington gave any information on the outcome of the discussions which have been under way in an effort to arrive at a solution of the Iranian oil nationalization issue.

However, the State Department was considering making a formal public statement this week on the mediation efforts. This report indicated another failure to reach an agreement satisfactory to Britain and yet meeting the Iranian conditions, namely complete operation for the British-owned industry under Iranian control.

Mossadegh has been in this country since October 8. He has been in Washington for more than 2 weeks holding secret discussions with the State Department.

I.P.C. Line Opening Set

Iraq Petroleum Co. expects to begin initial operation of its big-inch line between Kirkuk, Iraq, and Banias, Syria, sometime next spring. The line consists of 556 miles of 30 and 32-in. pipe.

It is being constructed for I.P.C. by Arabian Bechtel Co. Completion is scheduled for late in 1952.

The new line will move 275,000 bbl. of crude per day. At the western end, design calls for 90 miles of 26-in. because of the sharp drop in elevation between the mountains and the Mediterranean.

The Zubair-Fao, Iraq, 72-mile, 12-in. crude line being built by Basrah Petroleum Co., Ltd., an I.P.C. affiliate, will be finished by the end of 1951. This line extends from the new pools, producing from sand formations in the vicinity of Basrah, and terminates at the port of Fao, near the mouth of the Shatt-el-Arab River.

LATIN AMERICA

Creole to Spend More in '52

Creole Petroleum Corp. will spend a "much greater sum" in Venezuela during 1952 in connection with its operations than it did this year, the company has disclosed.

The firm plans to step up crude-oil production by 50,000 bbl. per day over the daily average at the end of 1951. To achieve this goal, it will drill approximately 220 new wells.

Emphasis will be placed on conservation projects, particularly gas-repressuring and pressure-maintenance operations, and a large number of such projects are now under study.

Among Creole's plans for 1952 is the revamping of the reinforced-concrete-caisson plant at La Salina in order to equip it to produce larger concrete piles to be used as derrick foundations in Lake Maracaibo. It also plans an extensive exploratory drilling campaign, with 16 wildcats now planned.

Creole has invested Bs. 175,000,000 (roughly $525,000,000) during the current year in plants and equipment. During the first 5 years following World War II the company had made record investments of Bs. 1,500,000,000 (approximately $4,500,000,000) in Venezuelan plants.

Chile's First Big Refinery

Engineering work has been commenced by M. W. Kellogg Co. on Chile's first major oil refinery, a complete 20,000-bbl.-daily plant on which construction work is to begin in about a year. The operator is the government Empresa Nacional del Petroleo.

The refinery will be located at a site about 10 miles north of Valparaiso and will include modern-type combination thermal-processing equipment to produce several petroleum products from either domestic or imported crude. Actual construction will be under the director of Kellogg's subsidiary, Kellogg Pan American Corp.

With the exception of facilities for L.P.G., the refinery is similar, though larger in capacity, to the one recently built by Kellogg in Brazil. Products from the Valparaiso plant will include, aside from L.P.G., motor gasoline, tractor gasoline, kerosine, two grades of diesel oil and heavy fuel oil. They will be moved to marketing points by both truck and pipe line.

Process facilities in the combination unit comprise crude-oil distillation, vis-breaking, thermal-reforming, thermal cracking, gasoline-stabilization, and treating equipment for sulfur removal from fuel gas, L.P.G., and gasoline. Kellogg also will design and engineer the power plant and all principal offsite facilities for the refinery.

Pemex Claims Discoveries

Two new oil discoveries in Mexico have been disclosed by Petroleos Mexicanos. Sen. Antonio J. Bermudez general manager said both of them indicate potentially important new fields.

The discoveries were in Tamiahua region of Tamaulipas about 220 miles northeast of Mexico City and in the Francita region of Tabasco 330 miles southeast of Mexico City. Both tested good-gravity oil at high pressure, Pemex said.

FAR EAST

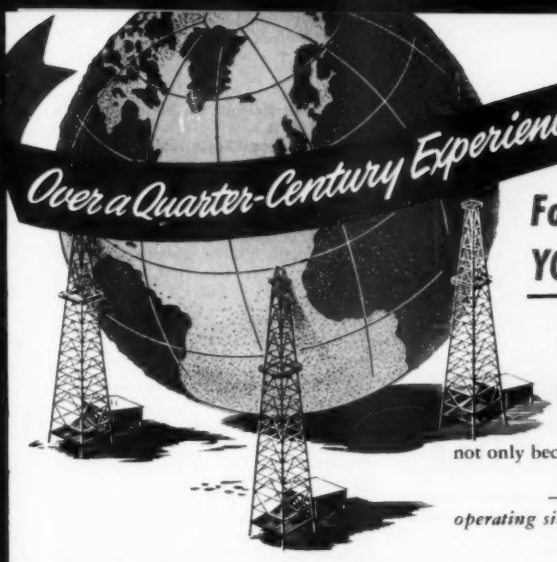
Indian Refinery Sought

Standard-Vacuum Oil Co. acknowledged last week that it is negotiating with the Government of India for the construction of an oil refinery in that country.

Reports from New Delhi said the Indian Government has approved the company's project. The refinery would be at Bombay and have a capacity of about 20,000 bbl. daily, according to these reports. However, in New York, the company said it had no knowledge of official government approval.

Standard-Vacuum also disclosed it has started an extensive aerial magnetometer survey of the Bengal basin in search of possible oil structures. The company has been a marketer in India for more than 50 years.

Construction of addititonal refinery capacity in Southeast Asia is considered urgent in view of the possible indefinite loss of Abadan in Iran. Much the Abadan production moved eastward, including some products taken under contract by Standard-Vacuum. India, with a large kerosine demand, was threatened with shortages after the Iranian shutdown.



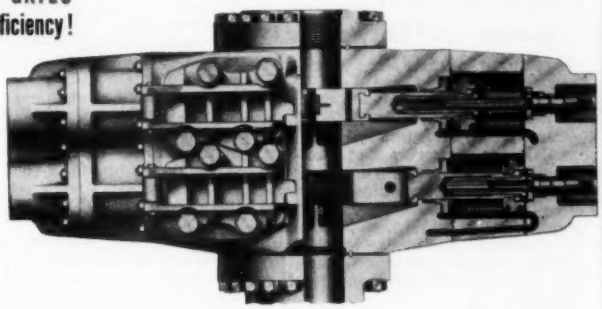
Over a Quarter-Century Experience in Controlling Well Pressures...

For ALL your pressure control needs YOU CAN DEPEND ON SHAFFER!

For well over a quarter of a century, the Shaffer name has meant continued leadership in dependable equipment to meet all types of pressure control problems . . . on wells of all depths . . . under the widely-varying operating conditions of the oil industry. Leading operators prefer Shaffer equipment, not only because it represents the utmost in rugged dependability—*but also because they gain so many other vital advantages—in greater compactness, greater adaptability, greater operating simplicity and ease of installation—when they standardize on Shaffer equipment.* Here are a few typical examples . . .

SHAFFER HYDRAULIC CELLAR CONTROL GATES

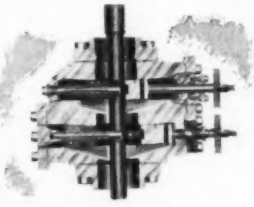
. . . Revolutionary in compactness, simplicity, efficiency!



Available in both Double (illustrated right) and Single types. Both types are amazingly compact—Double type only 30" high, Single type only 18½" high, even in sizes as large as 13⅜" (12" Series 900).

Rams are changed by simply opening side doors, replacing rams, then closing and bolting the doors. *And rams can be changed whether pipe is in or out of the hole!*

With all moving parts completely enclosed, this Gate is ideal for *all* drilling operations. There are many other important advancements built into this Gate, so be sure to get the complete story before you invest in *any* control gate equipment. Available in a complete range of sizes and pressure ratings!



SHAFFER MECHANICAL CELLAR CONTROL GATES

- Available in both Double (illustrated above) and Single types for operation by air, electric or steam drive *—plus complete manual stand-by operation!*
- Require minimum space—less than 29" for Double, 19" for Single, even in sizes as large as 13⅜" (12" Series 900).
- Self-Draining Ram Compartments, with no place for detrimental mud to accumulate and interfere with free ram travel . . . Quick, Easy Ram Changes by simply removing *one* end cover . . . and many other unique features make these gates outstanding in their field.

Domestic or overseas, wherever your operations call for mechanically-operated cellar control gates, Shaffer has the most advanced design available!

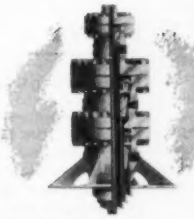
SHAFFER COMBINATION ROTATING BLOWOUT PREVENTERS AND STRIPPERS

—Combine in One Unit Every Necessary Feature for Complete Pressure Control While Drilling.

- Can be used with *any* standard kelly —square, hexagonal or octagonal; any type drill pipe—coupled, upset or flush. No special strings or equipment needed!
- Maintains continuous seal around pipe, couplings, tool joints, upsets, subs, drill collars, etc. *automatically* —whether string is rotating, being raised, lowered, or is stationary.
- Quick Releasing Bonnet permits lifting bits, reamers, other large-diameter tools through the unit quickly, easily.

. . . and many other unique features!

Nothing equals this unit for maintaining complete pressure control while the drill string is in the well. Available in a complete range of sizes.



SHAFFER LANDING HEADS AND TUBING HEADS

—Meet Every Requirement for Modern Compact Casing and Tubing Suspensions The World Over.

- Available in various types and packing arrangements. Base Heads and Combination Base, Casing and Tubing Heads are available for combining several units into one where space is at a premium.
- Shaffer provides a full line of modern Tubing Heads, Multiple Zone Hook-Ups and other equipment to complete your pressure control installation—for conditions anywhere in the world!

SHAFFER ADJUSTABLE FLOW BEANS

—The Pioneer Adjustable Flow Bean that Provides Operating Features Unequalled By Any Other Equipment.

- Available with Conical, Micro and electrically-heated Thermo Tips in both regular and hard metal designs to meet various drilling, production and refinery applications. All popular sizes—in both flanged or screwed connections—to meet your particular requirements.

ALSO, SHAFFER FISHING TOOLS!

In addition to pressure control equipment, Shaffer also provides one of the most complete lines of dependable fishing tools in the industry. Not only all conventional types—but many tools that are unique in operation and purpose. Write for complete information!

Send for your free copy of the new 1951 Shaffer Catalog. See pages 4525 to 4600 of your 1951 Composite Catalog for additional Shaffer data.

SHAFFER

HIGH PRESSURE DRILLING AND CONTROL EQUIPMENT • FISHING TOOLS THAT EXCEL

SHAFFER TOOL WORKS, Brea, California • California Service Shops: Santa Fe Springs and Taft
HOUSTON, TEXAS, 6006 Navigation Blvd. • ODESSA, TEXAS, 1925 West Second Street
OKLAHOMA CITY, OKLAHOMA, Acme Oil Tool Company, 1001 S. E. 29th Street
CASPER, WYOMING, Shaffer Tool Works, Post Office Box 1788
EXPORT SALES OFFICE: Shaffer Tool Works, 500 Fifth Avenue, New York, N. Y., U.S.A.

28 years OF OIL TOOL LEADERSHIP

RUGGED WILDCAT.—This photograph was taken during rigging-up operations of Pakistan Petroleum, Ltd., for its test well on the Sui anticline in Baluchistan. The rig is designed for a depth of 10,000 ft.

Pakistan Test

Burmah subsidiary spuds in remote 10,000-ft. wildcat

AN exploratory well in one of the most remote and inhospitable areas of Pakistan is now being drilled by Pakistan Petroleum, Ltd., recently formed subsidiary of Burmah Oil Co.

The wildcat will test the Sui anticline in the Dera Bugti area of Baluchistan. It is the first hole to be sunk by the new company, which was granted an oil-exploration license by the Pakistan Government earlier this year.

Site selection was based on geological work and aerial reconnaissance covering about 5,000 sq. miles. The test was spudded in October 10.

It is located 35 miles from Kashmor, the railhead of the narrow-gage line from Jacobabad, where the company established its supply base.

To reach the drilling site, the company was forced to build a 35-mile road. The area is rugged and sandy, has little water, and the temperature ranges from 125° F. in summer to below freezing in winter.

To provide water, the company laid a 40-mile, 4-in. pipe line to the Indus River. A pumping station was erected at the river and a booster station built along the route of the line.

The company also built a camp to house 150 people and added a power station and hospital. An air strip was built to provide for quick movement of supplies and personnel. Communication is maintained by radio with company headquarters in Karachi, and the company constructed a telephone line to the railhead.

A 10,000-ft. diesel-engine rig is being used on the test.

Indonesian Imports Slated

Standard Oil Co. of California has disclosed plans to begin shipments of crude oil from Indonesia to the West Coast next April. Initial rate of the imports will probably be about 8,000 bbl. daily, and may increase to 10,000 bbl. daily by July, company officials said.

A joint affiliate of Standard of Califoria and The Texas Co. has developed a major reserve in central Sumatra's Minas field and will begin production from the area early next year. It is the first production for these two companies in the East Indies.

Standard of California contracted about a year ago with Shell to import crude from British Borneo and since has been bringing an occasion cargo into San Francisco.

EUROPE

New Oil Strikes Reported

Three oil discoveries of possible significance have been recently reported in Europe and Africa.

The government-sponsored French company, Soc. des Petroles de l'Arique Equatoriale Francaise, recovered a reported 16 bbl. of oil along with considerable water from sands at 3,445 ft. and 3,540 ft. in a well drilled on the banks of the Ogowe River about 75 miles northeast of Lambarene in French Equatorial Africa.

The find appears to be the first definite discovery of oil anywhere in the central and southern part of Africa. Geologists familiar with the area, however, are skeptical of the prospects of large-scale production because of a said lack of folding.

Unofficial reports are that the French company, Soc. Nationale des Petroles d'Aquitaine has obtained production from deep formations in Lacq field in the foothills of the Pyrenees in southwestern France. A deep test, Lacq 3, which has been drilling for about a year tested good-gravity crude at a rate reported at more than 100 bbl. an hour from 11,440-11,506 ft.

Reports from Turin, Italy, said that the Italian state oil company, A.G.I.P., had discovered oil in the area of Calliano in the province of Asti southeast of Turin. There were no other immediate details available. The announcement was of particular interest since it is the first oil in the western part of the Po Valley.

Antwerp Refinery on Stream

The newly opened refinery of Soc. Industrielle Belge des Petroles at Antwerp, Belgium, was built at a cost of approximately £15,000,000 and includes facilities for the production of a complete line of primary petroleum products.

The plant, built by M. W. Kellogg Co., was recently placed in initial operation and is due to be formally dedicated next spring. Its capacity is 1,400,000 tons production annually. Soc. Industrielle is a joint 50-50 affiliate of Anglo-Iranian Oil Co., Ltd., and Petrofina, the Belgian company.

Facilities in the refinery consist of one atmospheric distillation unit of 26,000 bbl. per stream day; one viscosity breaking unit of 12,000 bbl. per stream day, one thermal refining reforming unit of 6,000 bbl. per stream day, one gasoline rerun unit of 700 bbl. per stream day, and three copper chloride units totaling 4,500 bbl. per stream day capacity.

Industry Briefs

Oil with the same properties of natural crude oil is being produced in a laboratory of the Institut Pasteur de Tunisie from a wide range of organic materials, according to reports from Tunisia. The reports credit Dr. Jean Laigret with developing a process for producing the oil from waste items such as refinery residues, household refuse, sewage mud, and waste products of meat and fish. The process is accomplished by action of a common bacillus, **per fringens**, in the presence of catalysts.

Reports from Mexico City say that Petroleos Mexicanos has decided to expand capacity of its Salamanca refinery from 30,000 to 60,000 bbl. daily. Under consideration is a pipe line for products from Salamanca to Mazatlan which would make unnecessary the projected new refinery at Mazatlan. The Salamanca refinery was placed on stream about a year ago. It was built by Arthur G. McKee & Co.

Geologists of the Shell Group have arrived in Dar-es-Salaam to conduct a 3-month oil-reconnaissance survey of the Tanganyika coast. Their arrival followed the granting of an exclusive prospecting license for the coast by the Tanganyika governor, Sir Edward Twining.

PERSONALS

New Chairman

Wescoat succeeds Jones as head of A.P.I. directors

NEW chairman of the board of the American Petroleum Institute is L. S. Wescoat, president of Pure Oil Co., who succeeds W. Alton Jones, president of Cities Service Co.

A native of Bridgeton, N. J., Wescoat was educated there and in Philadelphia. From 1908 to 1917 he worked in varied enterprises controlled by a Philadelphia banking syndicate, handling business administration and financial matters.

Following service in World War I, he joined the Fisher Body Corp. in Detroit. In 1922 he became vice president and general manager of the Southwestern Gas & Electric Co., Shreveport, a utility firm which also controlled production of natural gas and oil.

In 1925 he joined Pure in Columbus, Ohio, as general sales manager. He was elected vice president in 1927, vice president and secretary in 1932, and director in 1936.

Wescoat is a member of the National Petroleum Council and has been a director of the American Petroleum Institute for 15 years. He served as A.P.I. treasurer for 3 years and is a member of the A.P.I. board's executive committee. He also serves as a member of several National Petroleum Council committees.

He is a director of the U. S. Gypsum Co., a director and vice chairman of Automotive Safety Foundation, and a director of the National Highway Users Conference. In civic work in Chicago, he recently was chairman of the mayor's committee to organize the citizens traffic safety board and is a member of its executive committee.

J. R. Jackson, geologist for Humble Oil & Refining Co., has been transferred from Los Angeles to Chico, Calif.

Wilburn H. Seals, formerly with Continental Oil Co. at Fort Worth, Tex., is now a consulting geologist in Dallas.

John S. Cruse, Jr., geologist for Amerada Petroleum Corp., Tulsa, for the past 18 years, has resigned and joined **J. D. Hancock** in Dallas as full-time consultant.

George F. Carson, field superintendent for Sun Oil Co. at Delhi, La., has been transferred to Corpus Christi, Tex., and promoted to assistant district superintendent.

B. H. Brewer, formerly area petroleum engineer for Stanolind Oil & Gas Co. at Andrews, Tex., has been transferred to Tulsa as mechanical engineer.

John McBride, recent graduate of University of Oklahoma, has joined Bell Brothers at Robinson, Ill., as geologist.

C. R. Wagner has resigned as district geologist for Pure Oil Co. at Amarillo, Tex., and has joined Panoma Corp. as chief geologist.

John R. Graves, assistant geologist for Phillips Petroleum Co., has been transferred from Albuquerque, N. M., to Salt Lake City.

W. H. Ward, petroleum engineer for Sohio Petroleum Co., has been transferred from Midland, Tex., to Pauls Valley, Okla.

Thurman L. Jones, party chief for Atlantic Refining Co., has been transferred from New Iberia to Grand Isle, La.

H. F. Glair, general manager of manufacturing for Standard Oil Co. (Ind.) since 1933 and a director since 1934, has been appointed to a new position as director of purchases. **J. F. Hewson,** who has been manager of the purchasing department, continues in that capacity under Glair, and **S. A. Montgomery** advances to general manager of manufacturing. Montgomery was also elected to the board recently. **Dr. W. J. McGill,** who has been superintendent of operations since 1948, becomes assistant general manager. On January 1, 1952, **Dr. R. C. Gunness,** manager of the firm's research department, will be made an assistant general manager, manufacturing department. Gunness at present is on leave serving as vice chairman of the research and development board of the Department of Defense in Washington. **J. H. Forrester,** manager of the central division of Stanolind Oil & Gas Co., producing subsidiary of Standard, has been named to succeed Gunness.

A. H. Carpenter, engineer with Cities Service organization, has joined Phillips Petroleum Co. at Big Spring, Tex., as engineer.

S. C. Harper, staff manager of refining for Arabian American Oil Co. at Dhahran, Saudi Arabia, has been transferred to New York City and promoted to assistant manager of the manufacturing and supply department.

Charles I. Poole, district engineer for West Texas Gas Co., has been transferred from Midland to Lubbock, Tex., and promoted to utility engineer.

Paul A. Wade, dehydration operator for Tennessee Gas Transmission Co. at El Campo, Tex., has been transferred to Jackson, Tenn., as field engineer.

Penn Gouldy and **Wade Moore** will be district geologists in the newly established Casper, Wyo., district offices of Union Oil Co. of California. **Carrill R. Crawford** and **James C. Doyle** will be additional geologists in the district.

John W. Hemphill, division engineer for Sinclair Oil & Gas Co. at Independence, Kans., has been transferred to Corpus Christi, Tex. Other changes in the company include: **John J. Clark,** junior petroleum engineer at Seminole, Okla., transferred to Lindsay, Okla., and promoted to intermediate petroleum engineer; **W. C. Summy,** assistant division superintendent at Oklahoma City, transferred to Corpus Christi; **Ralph E. McAvoy,** assistant district superintendent at Seminole, transferred to Oklahoma City; **William O. Batson,** district superintendent at Covington, Okla., transferred to Ardmore, Okla.; **Chris C. White,** junior petroleum engineer at Gainesville, Tex., promoted to intermediate petroleum engineer; **William F. Parker,** assistant district superintendent at Ardmore, transferred to Seminole; **Harold A. Randolph,** district foreman at Columbus, Tex., transferred to Covington and promoted to district superintendent; **Paul W. Shepherd,** junior petroleum engineer at Lindsay, transferred to Kiefer, Okla., and promoted to intermediate petroleum engineer; **James Cleven,** district foreman at Russell, Kans., transferred to Houston; **T. O. Harder,** district foreman at Burrton, Kans., transferred to Russell, Kans.; **Bill R. Roark,** inter-

in CARBON, ALLOY and STAINLESS STEELS

. . . Still your best buy, because W-S longer service life and increased dependability give that permanency which will lower maintenance costs . . . They are drop forged.

Basic materials are selected from a wide choice of carbon, stainless and alloy steels and then subjected to the most exacting metallurgical controls from melt to bar. Through these precautions and subsequent precision machining operations, W-S assures the utmost in accuracy of finish, perfection of threads, sockets, angles and concentricity. All W-S Fittings, — Screwed and Socket Welding Types, — are finally instrument inspected.

W-S Bulletin A3-50 details the Carbon Steel Line. Bulletin S-1 is devoted to Stainless and the Alloys. W-S will gladly furnish information on the new FEATHERLITE Fittings — a recent big step in a wide range of services. Write today for the specific bulletin you desire.

Sold Through Leading Distributors

9-L-2

DISTRIBUTOR PRODUCTS DIVISION

WATSON-STILLMAN

Established 1848

ROSELLE, NEW JERSEY

Designers and Manufacturers of Forged Steel Fittings, Valves, Wire Rope Shears, Hand Pumps, Jacks, Pipe Benders and Hydraulic Equipment

PERSONALS

mediate petroleum engineer at Covington, transferred to Pampa, Tex., and promoted to senior petroleum engineer; **Edwin L. Armour,** district foreman at Seminole, transferred to Olney, Tex.; and **Jess J. Heiskill,** district foreman at Henderson, Ky., transferred to Seminole.

Calvin A. Nevels has been named assistant superintendent of the Lake Charles, La., district for Magnolia Petroleum Co. **Thomas E. Wright** has been appointed production foreman of the Brownfield, Tex., district.

E. A. Polumbus, Jr., who recently resigned as division production engineer with Carter Oil Co. at Denver, has organized a consulting petroleum engineering service to serve Rocky Mountain operators. He had been with Carter for 18 years.

Charles J. Pardee, sales manager for Mid-State Chemical Co., has been appointed executive secretary of the Illinois Oil and Gas Association.

Harvey L. Garland, production and drilling engineer for Seaboard Oil Co., has been transferred from Los Angeles to Casper, Wyo.

H. R. Hunter, petroleum engineer for Humble Oil & Refining Co., has been transferred from Midland to Stanton, Tex.

Dalton Moore, Jr., formerly reservoir engineer with The Chicago Corp., has joined Burdell Oil Co. at Snyder, Tex.

Bernard Moroz, engineer for British-American Oil Producing Co., has been transferred from Selman City, Tex., to Oklahoma City.

W. L. Matjasic, district geologist for Honolulu Oil Corp., has been elected president of the Pacific section of the Society of Exploration Geophysicists. **D. H. Scott,** geophysical supervisor for The Texas Co., was named vice president of the southern district; and **Robert B. Galeski,** geologist for Honolulu, was named vice president of the northern district. **M. Sklar,** geophysicist for Union Oil Co., is the new secretary-treasurer. The S.E.G. annual meeting was held jointly with the Society of Economic Paleontologists and Mineralogists, and the American Association of Petroleum Geologists. The S.E.P.M. Pacific section elected **W. T. Rothwell,** division paleontologist for Richfield Oil Corp., president; and **James L. Cowell,** paleontologist for Shell Oil Co., secretary-treasurer. The new A.A.P.G. officers are shown in the photograph on page 130.

Dr. Gaylord P. Harnwell, chairman of the department of physics and director of the Randall Morgan Laboratory of Physics of the University of Pennsylvania, has been appointed chairman of the committee on ordnance of the Research and Development board, Department of Defense.

Charles O'Boyle, formerly independent geological consultant at Denver, has been named assistant chief geologist for Union Oil Co. of California. **Charles Edwin Riddell,** formerly with United Geophysical Corp. in Brazil, has been named division geophysicist for Union with headquarters at Denver.

Christ Kaiselas, recent graduate from the University of Pittsburgh, has joined Slagter Producing Co. at Evansville, Ind., as chief geologist.

J. L. Crawford, independent operator, has closed his Evansville, Ind., office and will conduct his Tri-State operations from the Tulsa office. **J. H. Poteet,** formerly geologist for Crawford, is now an independent consultant at Evansville.

Hugh Armstrong, formerly a partner in Armstrong & Sutton Drilling Co., and **L. B. Horn** have organized Armstrong & Horn Drilling Co. in San Antonio, Tex.

W. G. Inabnet, district superintendent for Shell Oil Co. at Hobbs, N. M., has been transferred to the Tulsa area. Other changes include: **W. B. Banks, Jr.,** mechanical engineer at New Orleans, transferred to Hobbs; **P. W. Miller, Jr.,** exploitation engineer at Odessa, transferred to Hobbs; **E. W. Nestor,** exploitation engineer at Hobbs, transferred to Midland, Tex., and **W. T. Weller,** junior mechanical engineer at Midland, promoted to mechanical engineer.

C. H. Sample, consulting geologist, and **A. F. Childers, Jr.,** formerly with Gulf Oil Corp., have opened geological consulting offices at Houston.

C. A. Wick, production superintendent for Ohio Oil Co., has been transferred from Wooster, Ohio, to McLeansboro, Ill. He has been with Ohio 22 years.

W. A. Grant, former partner in Harber Drilling Co., will head the new Grant Oil Co. organized in Wichita. **Paul Pfiefer** will be the firm's production superintendent.

Arthur R. Carmody, North Central Texas Oil Co., has been reelected president of the Louisiana-Arkansas division of the Mid-Continent Oil and Gas Association. **Sam S. Caldwell** was reelected executive vice president, secretary, and treasurer. Vice presidents elected for North Louisiana include: **John J. Frommer,** Ohio Oil Co.; **Joe T. Goodman,** Gulf Refining Co.; **C. H. Lyons,** Lyons, Prentiss & McCord; **M. C. Hoffman,** Pan-Am Southern Corp.; **W. C. Fullilove,** Allison Drilling Co.; **A. H. Tarver,** independent operator; and **A. H. Weyland,** Arkansas Natural Cos. Vice presidents for South Louisiana are: **L. Lee Welch,** Vincent & Welch; **H. C. Teasdel,** The

ORGANIZATION HEADS.—Presidents of four leading industry organizations are pictured at New Orleans during the annual meeting of the Louisiana-Arkansas division of the Mid-Continent Oil and Gas Association. Left to right are R. F. Windfohr, Fort Worth, Tex., president of the Texas Mid-Continent Oil and Gas Association; Jake L. Hamon, Dallas, president of the Mid-Continent Oil and Gas Association; Charlton H. Lyons, Shreveport, president of the Independent Petroleum Association of America; and A. R. Carmody, Shreveport, president of the Louisiana-Arkansas division of the Mid-Continent Oil and Gas Association.

PERSONALS

California Co.; **J. H. Rambin,** The Texas Co.; **Bouwe Dykstra,** Shell Oil Co.; and **E. C. Bateman,** Bateman Drilling Co. Vice presidents from Arkansas are: **C. H. Murphy, Jr.,** Murphy Corp.; and **W. H. Rector,** Magnolia Petroleum Co.

Donald S. McBride, district engineer for Tide Water Associated Oil Co., has been transferred from Magnolia, Ark., to Kamay, Tex. Other transfers in the firm include: **William E. LaRoche,** field engineer at Kilgore, Tex., to Midland, Tex., as senior field engineer; **Lee C. Sharrai,** senior gas tester at Kilgore, to Midland; and **William H. McPhail,** field engineer at Kamay, to Eureka, Kans. **Joel E. Hawkins,** recent graduate of Northeastern State College, has joined the firm as junior engineer at the Drumright, Okla., refinery.

B. L. Connelly, Houston, president of Warren Oil Corp., has been elected chairman of the board of Devonian Co. and **E. S. Calvert,** Tulsa, has been reelected president and a director and has been named a vice president and a director of Warren Oil Corp. **H. F. Beardmore** and **P. L. Lyons,** Houston, vice presidents and directors of Warren, have been elected vice presidents and directors of Devonian. **J. F. Anderson,** of Houston, has been elected a director of Warren and Devonian in charge of exploration, and **Harry Dean,** Tulsa, has been reelected secretary and treasurer of Devonian. The shift in officers followed acquisition by Warren of 100 per cent interest in Devonian. *(See page 111.)*

E. D. Bivens, vice president and assistant general manager of United Fuel Gas Co., Charleston, W. Va., has been named vice president and general manager succeeding **H. C. Mefford, Sr.,** who has retired.

E. J. Frueh, manager of St. Louis operations for Triangle Refineries, Inc., has been appointed director of supply and transportation in the Chicago office of the Petroleum Administration for Defense.

Jerrell O. Deen, first engineer at the Sarepta, La., compressor station for United Gas Pipe Line Co., has been transferred to Koran, La., and promoted to chief engineer. He has been with the firm since 1928.

G. E. Merkle, Fiske Brothers Refining Co., was elected president of the National Lubricating Grease Institute at the annual convention recently. **Wayne Albright,** Standard Oil Co. (Ind.), was named vice president; and **C. B. Karns,** Esso Standard Oil Co., was reelected treasurer.

A.A.P.G. OFFICIALS.—New officers elected at the annual meeting of the Pacific section of the American Association of Petroleum Geologists are, left to right: Rufus M. Smith, geologist for Continental Oil Co., secretary-treasurer; Homer J. Steiny, geologist for Tide Water Associated Oil Co., president; and Harold H. Sullwold, Jr., geologist and petroleum engineer for William Ross Caheen & Associates, vice president.

M. W. Sublet, district superintendent of crude-oil purchasing for Oklahoma, Kansas, Rocky Mountains, and North and West Texas for Sohio Petroleum Co., has been transferred from Oklahoma City to Fort Worth, Tex., as district superintendent of the Texas and New Mexico area.

Judd W. Healy, chemical engineer in the Standard Oil Co. (Ind.) research laboratory at Whiting, Ind., has been promoted to group leader at the firm's Wood River, Ill., laboratory. He has been with the firm since 1947.

E. P. Kerr, formerly district geologist with Phillips Petroleum Co. in Oklahoma City, has joined Bay Petroleum Corp. as district manager of the new office in Albuquerque, N. M.

Frank E. McKinney has resigned as a vice president and director of United States Pipe Line Co., following his acceptance of the nomination as chairman of the democratic national committee.

T. A. Kindsvater, field superintendent for British American Oil Producing Co., in East Texas field, has been transferred to the company's newly created office and promoted to district superintendent. **G. H. Walkup,** field foreman in the southern district at Houston, has been transferred to East Texas replacing Kindsvater.

A. H. Bell, of Bell & Burden, has been elected vice president of the California chapter of the American Association of Oilwell Drilling Contractors. Other officers elected include: **E. C. Brown,** of Brown Drilling Co., chairman; **Carl Gates,** vice chairman for the Los Angeles basin; **M. V. Stansbury,** of Stansbury, Inc., vice chairman for the San Joaquin Valley region; and **Charles Reiman,** secretary.

D. O. Waymire, chief station engineer for Shell Pipe Line Corp. at Westbrook, Tex., has been transferred to Hamlin, Tex., in the same capacity.

DEATHS

A. A. Viersen, 90, pioneer Okmulgee, Okla., oilman, and an associate of the Viersen and Cochran oil firm, died in Okmulgee November 12.

George H. Ennis, 68, of Oil Well Water Locating Co., died November 5 at Long Beach, Calif. Ennis invented a method of determining the point of entry of water into oil wells and in recent years was the developer of instruments for the measurement and control of water and oil.

I. H. Grancell, 73, founder and head of the company bearing his name, died at Los Angeles on November 1.

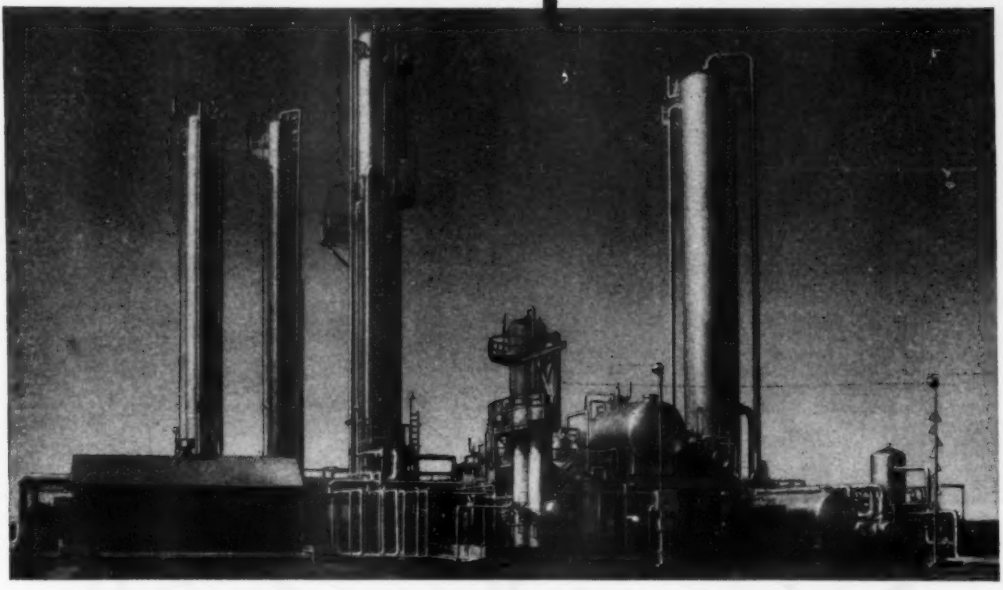
Frank R. Forgey, 61, president of Hexigon Royalty Oil Co. of California, died November 3 at Los Angeles.

Charles Fred Duroy, 51, construction superintendent with Superior Oil Co., died November 2 at Long Beach, Calif.

David O. Saul, 59, retired refinery engineer, died November 1 at Long Beach, Calif.

John Leslie Wilson, 72, pumper with Royal Petroleum Co., died November 2 at Long Beach, Calif.

COMPACT DESIGN { *Means Lower Operating Costs –High Operating Efficiency*

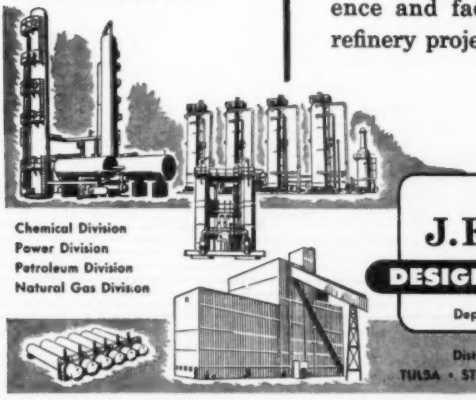


In Natural Gasoline Plants by Pritchard

The natural gasoline plant, illustrated above, was designed and constructed by Pritchard for Hugoton Plains Gas & Oil Co. It's located astride the Oklahoma-Kansas border, three miles north of Tyrone, Oklahoma, and has a design capacity of 120,000,000 SCFD.

Here is just one example of compactness of design made possible by Pritchard's modern concept of engineering, processing and design...design that means big savings on initial investment and operating costs, *with no loss of capacity or operating efficiency!*

Why not avail yourself of Pritchard's skill, experience and facilities on your next gasoline plant or refinery project?



We invite your specific inquiry.

NATIONAL CONSTRUCTORS ASSOCIATION MEMBER

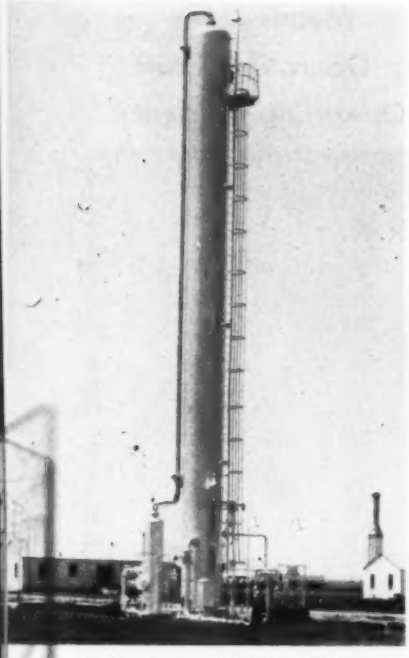
Chemical Division
Power Division
Petroleum Division
Natural Gas Division

J.F. Pritchard & Co.

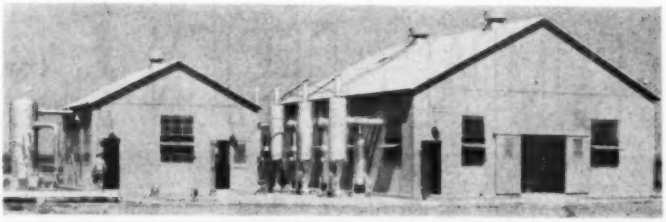
DESIGN • ENGINEERING • CONSTRUCTION

Dept. No. 231 — 908 Grand Ave., Kansas City 6, Mo.

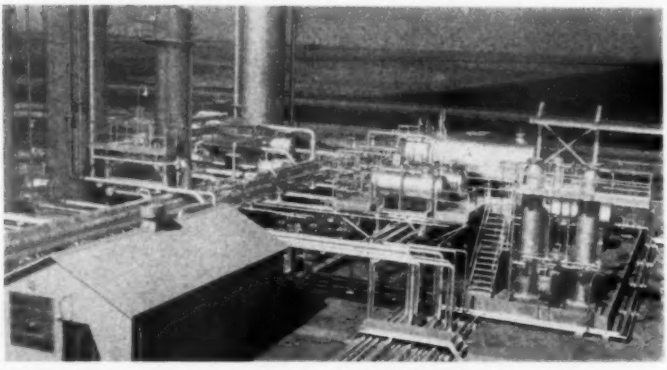
District Offices: CHICAGO • HOUSTON • NEW YORK • PITTSBURGH
TULSA • ST. LOUIS • Representatives in Principal Cities from Coast to Coast



High-pressure, 12,000,000-cu.-ft.-daily natural-gas absorber.



These buildings, located on the Hugoton Plains Oil & Gas Co. property, house electrical generating equipment and a propane refrigeration unit.

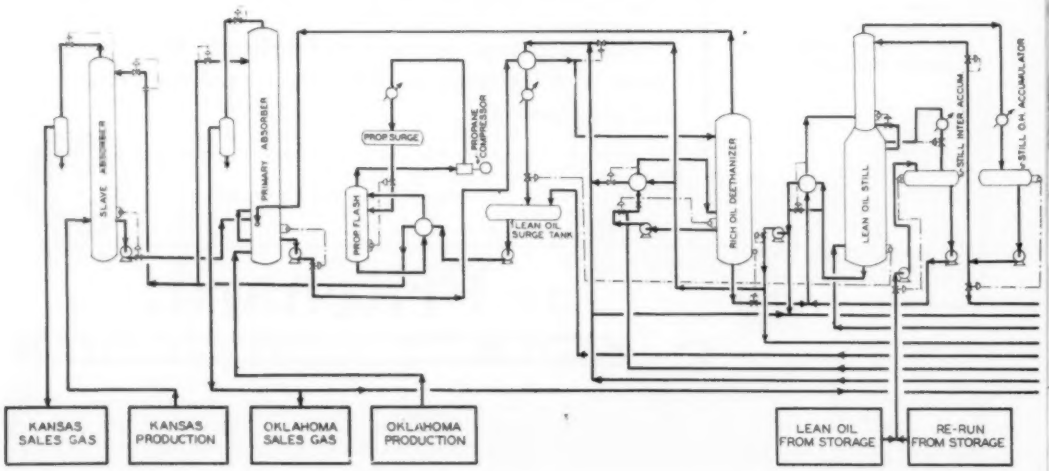


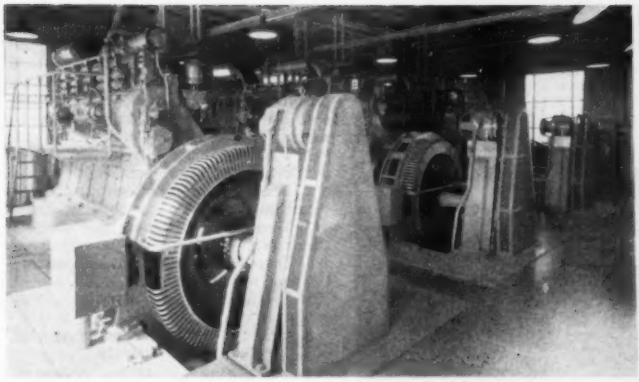
Processing area of Hugoton Plains Oil & Gas Co. natural-gasoline plant, which incorporates a deethanizer in the rich-oil stream.

Development in Hugoton Gas Field

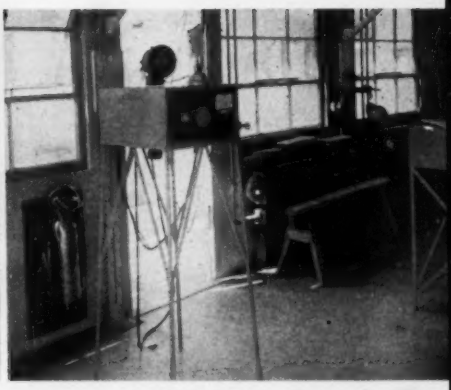
Here's a field processing operation serving 176 gas wells. The 215-mile gathering system connects with 144 wells in Oklahoma and 32 in Kansas. Production includes propane, butane, and natural gasoline.

by W. B. Reeves
Gasoline plant superintendent, Hugoton Plains Gas & Oil Co.





These three alternators supply the necessary electrical power for operation of the field processing plant in Hugoton field. No steam for power or processing is used in plant's operation.



A view of the control room at the Hugoton Plains Oil & Gas Co. installation showing radio-communication equipment.

IN December 1950, Hugoton Plains Gas & Oil Co. acquired gas-producing property in Hugoton gas field. This property consists of 176 gas wells, gas-gathering system, natural-gasoline plant, and equipment and personnel organization necessary for the operation of the system.

The gas wells, drilled by Midwestern Drillers, of Tulsa, are located in Oklahoma and Kansas; 144 wells being in Oklahoma and 32 wells in Kansas.

The gas-gathering system consists of approximately 215 miles of pipe line which was designed and engineered by Midwestern Engineering Co., of Tulsa. The pipe lines were constructed by Arey-Phillips Construction Co. of Pampa, Tex.

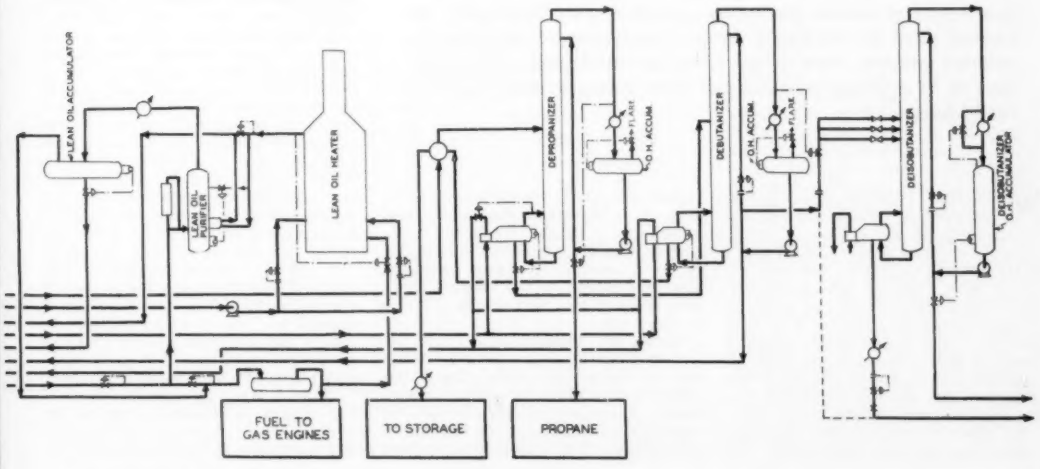
Gas from the wells flows through the gasoline plant under well pressure. Northern Natural Gas Co.'s compressor station, located approximately 4½ miles north of the gasoline plant, pumps the gas from the gasoline plant into Northern Natural's system. Gas is delivered to Northern Natural through two metering stations at a gage pressure of 275 psi. Gas from Oklahoma wells is delivered to Northern Natural's metering station located in Oklahoma just south of the Oklahoma-Kansas line. Gas from Kansas wells is delivered to Northern Natural's metering station located in Kansas just north of the Oklahoma-Kansas line.

The gasoline plant, located on the Oklahoma-Kansas state line, 3 miles north of Tyrone, Okla., was engineered and constructed by J. F. Pritchard & Co. of Kansas City, Mo. This plant employs the oil-absorption-type extraction process. The plant consists of two absorber columns, one located in Oklahoma and one in Kansas; distillation equipment; storage tanks; and loading facilities, both truck dock and railway tank-car loading rack. The major portion of the gasoline plant is located in Oklahoma. The truck-loading facilities are located within the plant yard, while the railway tank-car loading rack is located near the Chicago, Rock Island & Pacific Railroad, approximately 3 miles northeast of the town of Tyrone.

The plant was designed to operate without steam. Considerable savings in investment and operating costs were made possible by this design. Heat required by the distillation processes carried on in the plant is obtained from one gas-fired lean-oil Petro-Chem heater.

Efficient stripping of the absorption oil is accomplished by means of a two-section fractionating still which receives its heat input from the lean-oil heater. Final stripping is accomplished by partial vaporization of the lean oil from the heater in the bottom section of the still. The liquid products extracted from the absorption oil is kept free from any trace

(Continued on page 156)



The spent-acid regeneration plant operated by Cities Service Refining Corp., at its Lake Charles, La., refinery.

Sulfuric Acid Regeneration At Cities Service Refinery

by George Weber
Refining Editor

The current sulfur shortage has caused refiners to review their sulfuric acid requirements and to investigate the possibilities of improving spent-acid regeneration and the economics of utilizing hydrogen sulfide for sulfur or acid recovery. But ideal conservation measures cannot always be consistent with the equally important need for maximum current production of alkylates for aviation gasoline. Here is how Cities Service handles these problems at its acid-regeneration unit built during World War II at Lake Charles, La.

WHEN the Tutweiler refinery was completed by Cities Service Refining Corp. in early 1944, it represented the most modern installation of its kind in existence. The new refinery was designed and built primarily to produce maximum yields of military aviation gasoline. For that purpose three large fluid catalytic cracking units, two sulfuric acid alkylation plants, and a butane isomerization unit were incorporated into the refinery flow scheme.

In view of the wartime need for conserving sulfuric acid which was required in large volumes for alkylation, an acid-regeneration plant was considered a must. This facility has proved useful in postwar operations as well, undergoing some modifications to conform to the varying characteristics of the feed stocks charged to the unit.

Today, the combination of high alkylate demand plus a serious shortage of sulfur has again placed the plant in a position of prime importance. It enables Cities Service to maintain maximum aviation-gasoline production, at the same time reduce dependence on outside sulfur sources to a minimum.

When the refinery was in the blueprint stage, Chemical Construction Co. of New York was contracted to design a sulfuric acid plant which would meet the following requirements:

1. Produce 350 tons per day of 98 per cent alkylation acid.
2. Produce 93 per cent acid for treating purposes.
3. Dispose of 375 tons per day of spent acid.
4. Dispose of objectionable sulfur-bearing waste.
5. Produce entire capacity from sulfur if desired.
6. Operate between the ranges of one-third and full capacity.

The resulting installation consisted of two identical units which can be operated individually or in combination. Each is equipped with two decomposing furnaces and dual gas scrubbers, cooling towers, and precipitators. Fig. 1, a simplified flow diagram of one unit, illustrates the regeneration operation.

Plant Operation

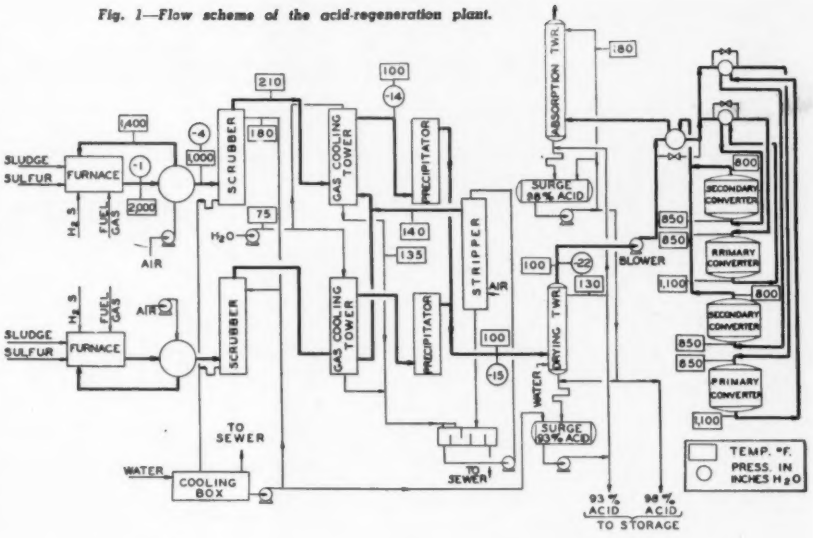
Furnace temperature is maintained at 2,000°-2,200° F. At that temperature, the spent acid, hydrocarbons, mercaptans, hydrogen sulfide, and crude sulfur currently fed to the furnace, decomposes to form sulfur dioxide, carbon dioxide, and water. These combustion gases, together with a small volume of excess air, preheat incoming air and are further cooled in a scrubbing tower where contact with 10-40 per cent acid also provides ash removal. A third cooling step is provided by direct water spray in the gas-cooling tower. Cooling water withdrawn from this column is stripped with air for recovery of dissolved sulfur dioxide.

The cooled gas mixture then passes to Cottrell mist precipitators which remove undecomposed acid from the vapors entering the drying tower where moisture is removed by direct contact with 93 per cent acid. Flow of combustion gases from the atmospheric furnace through the cooling and drying stages is induced by a blower which takes vacuum suction on the drying tower overhead, and discharges to the catalytic conversion section. The split gas streams pass through two converters in series, where sulfur dioxide is combined with excess air introduced at the drying tower, to form sulfur trioxide. Feed preheat by exchange with converter effluent from both stages is provided to promote the reaction. The sulfur dioxide concentration in the charge to the first converter must amount to 7 per cent by volume to sustain the catalytic reaction, and a minimum of 7.3 per cent is considered necessary for smooth operation.

Effluent from the parallel conversion systems is recombined in an absorption tower where SO_3 is dissolved in a countercurrent flow of 98 per

cent strength by controlled dilution with excess 93 per cent acid from the drying tower. The excess 98 per cent acid produced by reaction of SO_3 and water is withdrawn to storage from the absorption tower surge drum. The plant operates at an average efficiency of 90 per cent, converting that fraction of sulfur in the combined furnace feeds to 98 per cent and 93 per cent sulfuric acid.

Fig. 1—Flow scheme of the acid-regeneration plant.



Operating Changes

The acid plant was originally designed and operated to reconstitute spent alkylate sludge of 92 per cent strength. Following the war, operators varied the alkylation operation by substituting propylene feed for a large proportion of the butylenes previously alkylated to produce military aviation blend stocks. The conversion to a predominately propylene alkylation operation increased acid catalyst requirements roughly three-fold for comparable volumes of olefin charge. Cities Service engineers found, however, that they could alkylate successfully to 83 per cent spent acid instead of the 92 per cent minimum strength previously maintained. This in effect partially offset the increased requirements for fresh 98 per cent acid.

A second postwar change affecting regeneration plant balance was a conservation measure involving the recovery of sulfur entering the refinery with the crude charge. To the original furnace feed comprising acid sludge and elemental sulfur, was added a hydrogen sulfide stream separated in a Girbotol unit from the depropanizer overhead product of the catalytic gas recovery plant.

These departures from original operations for which the regeneration plant was designed altered plant balance and necessitated a compromise between maximum sludge recovery and maximum acid production.

Originally, the 92 per cent alkylate sludge combined with spent acid of lower strength from treating operations, represented a furnace feed of higher concentration than the minimum 87 to 88 per cent strength sludge required for ideal furnace combustion. This combined charge plus some crude sulfur to maintain proper sulfur dioxide concentration during conversion, permitted operators to regenerate essentially all alkylate sludge plus about 90 per cent of the spent treating acid. At the same time, 98 per cent acid production was held at the desired high level for alkylation at full capacity.

Postwar conversion to lower sludge concentrations and substitution of hydrogen sulfide for some of the crude-sulfur charge, altered this balance and in effect reduced the capacity of the unit. The 88 per cent alkylate sludge combined with spent acid from kerosine and blend-oil treating resulted in a furnace feed of about 85 per cent strength. Spent alkylation acid comprises about 4 per cent water and 8 per cent hydrocarbons, and that portion further used for blend oil treating picks up as much as 22 per cent water. In addition to further water dilution, sludge from kerosine and blend-oil treaters contains additional hydrocarbons and mercaptan sulfur.

The higher water content of spent-acid feed necessitated burning more fuel gas to maintain a furnace temperature sufficiently high for decomposition. Increased water present in sludge feed, plus added water vapor and carbon dioxide formed by combustion of hydrogen sulfide, fuel gas, and liquid hydrocarbons result in a substantially lower sulfur dioxide concentration in the combustion gas mixture. Total plant throughput is limited by the capacity of the cooling system. Flow rate is further limited by capacity of the blower. This results in less net throughput of sulfur dioxide and less acid production. SO_3 concentration in total furnace combustion gases can be raised by burning more sulfur, but the limited

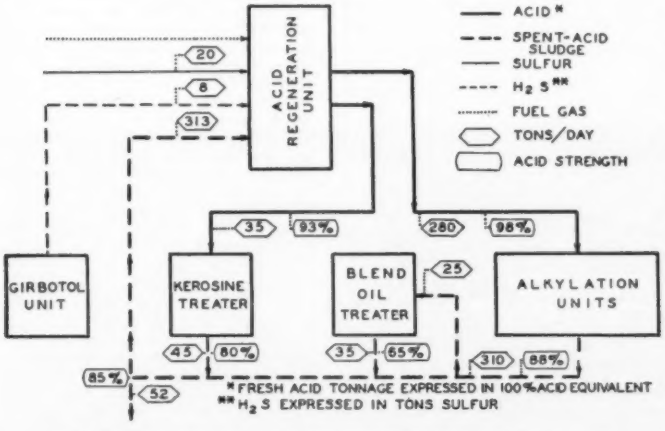
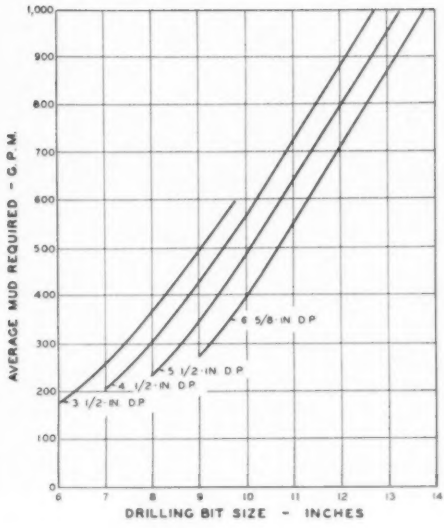


Fig. 2—Processing arrangement of acid-regeneration plant and units it serves.

(Continued on page 157)



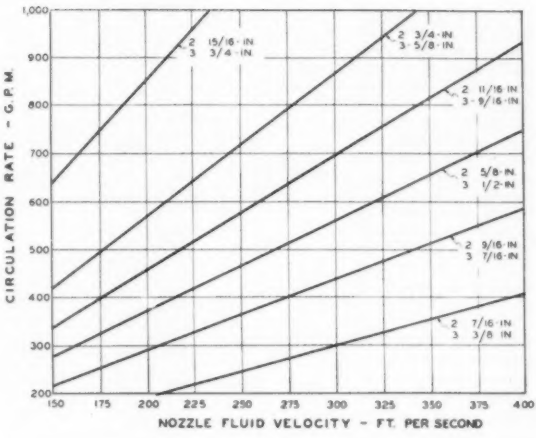

CIRCULATION RATE - G.P.M.
NOZZLE FLUID VELOCITY - FT. PER SECOND
2 15/16-IN 3 3/4-IN
2 3/4-IN 3 5/8-IN
2 11/16 IN 3 9/16-IN
2 5/8-IN 3 1/2-IN
2 9/16 IN 3 7/16-IN
2 7/16 IN 3 3/8 IN

Fig. 1—(Left) Normal mud requirements, based on annulus velocity of 175 ft. per minute.

Fig. 2—(Above) Rate of circulation based on standard-size jet nozzles.

New Light on

JET-BIT DRILLING

by W. S. Sease

For from being limited to use on steam rigs, some of the most successful users of jet bits are power rigs. Correct mud volume, not pressure, is basic requirement.

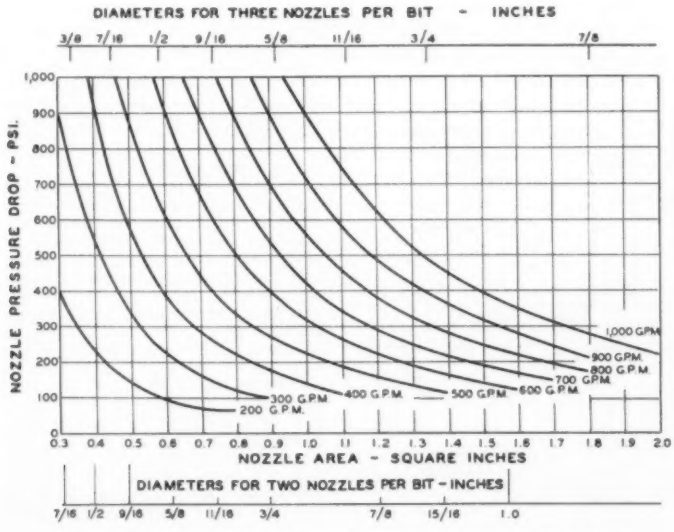
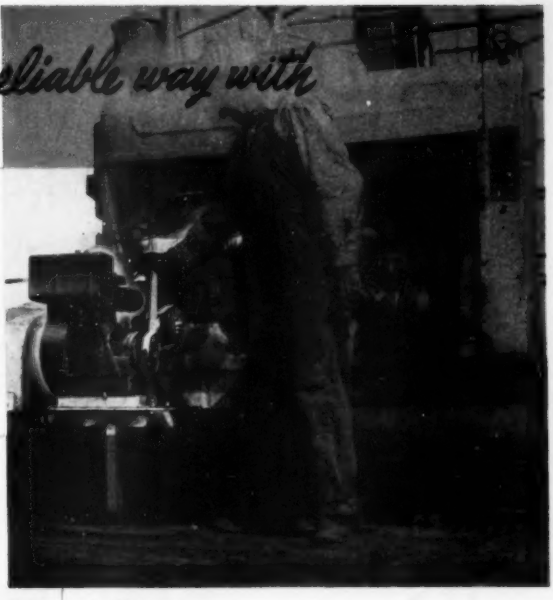


Fig. 3—Nozzle pressure drop vs. nozzle area for various circulation rates.

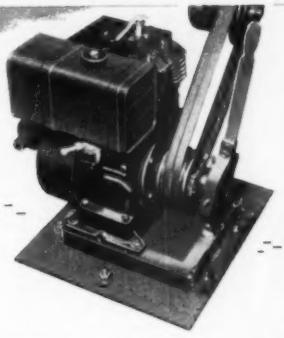
THERE are many erroneous ideas existent concerning the problems of jet bit drilling, the most prevalent being that only steam rigs can use jet bits, due to the high mud pressures required. These misconceptions probably stem from the fact that steam rigs were the first to use jet bits, and that in early experiments some rigs carried pressures to extremes. At present, some of the most successful users of jet bits are power rigs, and with a better understanding of the principle of jet drilling, there has come a leveling, or decrease, in the mud-system pressure. Actually, correct mud volume, not pressure, is the basic requirement of jet bits, and maintaining the volume does not usually require over 200 psi. more pressure than conventional drilling. In many cases contractors have changed their drill-pipe size, and are using jet bits with less pressure than they formerly used for conventional drilling.

To obtain the maximum benefits from jet bits, it is necessary for the contractor to understand the basic hydraulic factors involved, and, to a certain extent, reeducate his crews in the simple problems of mud volume control. This article has been written to present the engineering problems involved in jet-bit usage, in graphic form for easy use by all.

Start engines the reliable way with



UNITED
Multi-Cylinder
ENGINE STARTER



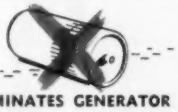
Prices on Application.
(Most popular size $292.00)

- RELIABLE — Continuous cranking power from easily started gasoline engine.
- ECONOMICAL — Pays for itself by eliminating troublesome battery, generator and starter maintenance.
- SAFE — Recommended by safety engineers.
- EASILY INSTALLED — Simply remove electric starting motor and insert Heavy Duty Bendix Starter Drive Assembly. (Bendix Drive operates off of ring gear. Specify type of engine to be started when ordering.)

At Your Nearest United Supply Store

ELIMINATES BATTERY

ELIMINATES ELECTRIC STARTER



ELIMINATES GENERATOR

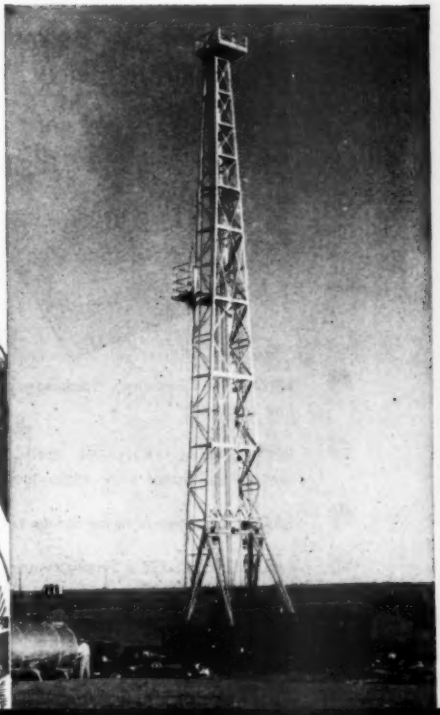
Courtesy
Service
Dependability

UNITED SUPPLY
AND *Manufacturing* COMPANY
TULSA, OKLAHOMA
Stores in Kansas, Oklahoma, Texas,
Louisiana, and New Mexico

LEE C.

Moore

drilling structures since 1907



For 44 years Lee C. Moore has pioneered new and improved drilling structures that have found ready acceptance in the oil industry. Moore Derricks have been used to drill the world's deepest wells, and Moore Masts have drilled below 15,000 feet. Look to Lee C. Moore for continued leadership in developing all types of drilling structures for use the world over.

LEE C. MOORE CORPORATION

TULSA • DALLAS • HOUSTON • MIDLAND • SHREVEPORT • WICHITA • CENTRALIA • PITTSBURGH

Export Office — 9 Rockefeller Plaza, New York 20, N. Y.

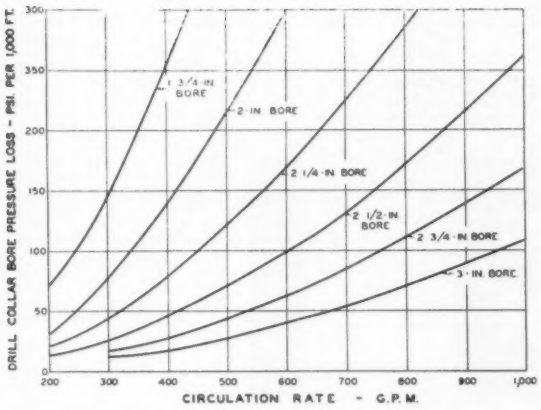


Fig. 4—Pressure loss in drill collar vs. circulation rate for various collar bore dimensions.

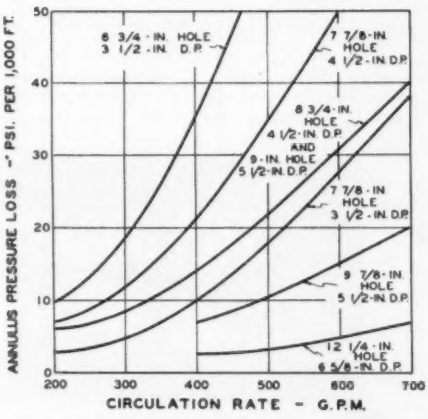

ANNULUS PRESSURE LOSS - PSI. PER 1,000 FT.
CIRCULATION RATE - G.P.M.
8 3/4-IN. HOLE 3 1/2-IN. D.P.
7 7/8-IN. HOLE 4 1/2-IN. D.P.
8 3/4-IN. HOLE 4 1/2-IN. D.P. AND 9-IN. HOLE 5 1/2-IN. D.P.
7 7/8-IN. HOLE 3 1/2-IN. D.P.
9 7/8-IN. HOLE 5 1/2-IN. D.P.
12 1/4-IN. HOLE 6 5/8-IN. D.P.

Fig. 6—Annulus pressure loss vs. circulation rate for various combinations of hole and drill pipe.

Engineering Principles for Usage

The correct usage of a jet bit depends entirely on maintaining a minimum mud velocity through the jet nozzles. Correspondingly, the upstream, or annulus, velocity should be kept at a given average figure. It is a problem of mud volume alone, not pressure, and pressure should be considered only in regard to the pump's operating limit. Pressure and volume are definitely tied together in the hydraulic equations needed to determine our answers, but the successful jet driller learns to count pump strokes to determine his volume instead of guessing at his answer by looking at the pressure gage.

Many power rigs have small pumps, or underpowered pumps, even for conventional drilling; hence they are necessarily restricted as to the depth to which they can successfully drill with jet bits. On the other hand, by correct selection of pump-liner sizes, many small rigs are partially overcoming this handicap, and rigs with larger pumps are also benefiting by the same procedure. Steam rigs are fortunate in having very few problems that are not easily overcome.

Before using jet bits for the first time, it is suggested that the contractor review the data submitted below, check it with his rig to see how far his hydraulic system can properly use jet bits, then select the proper pump liners to secure maximum over-all efficiency. If the correct minimum nozzle velocity and mud volume are maintained, he will definitely secure benefits from jet bits.

Normal mud requirements. — The correct volume of mud for the average hole, whether drilled with conventional or jet bits, is considered to be equivalent to an upstream, or annulus, velocity of 175 ft. per minute. Fig. 1 shows this normal mud requirement for some of the common sizes of drill pipe. Under excessively hard formation drilling, where the penetration rate is 10 ft. per hour or less, a mud volume of two-thirds of this figure is sometimes used, but this practice is not recommended for jet bits. In jet drilling it has been found that the higher the mud volume, the better the results; therefore, the values shown in Fig. 1 should be considered only as a minimum average, and every effort should be made to exceed them. Some of the most successful rigs are pumping 50 to 100 per cent more mud than shown by this curve.

Jet nozzle velocities.—With these in the range of 150 to 175 ft. per second a jet bit will perform comparable to, or possibly slightly better than a conventional bit. As the nozzle velocity goes above 175 ft. per second, a de-

(Continued on page 173)

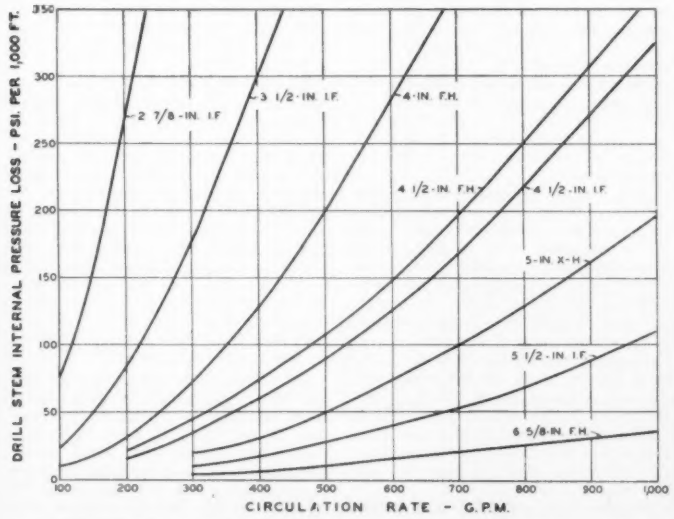


Fig. 5—Pressure drop per 1,000 ft. of drill stem vs. circulation rate for drill stems of various internal diameters.

THE AUTHOR

W. S. Sease is Dallas representative of Globe Oil Tools Co., Los Nietos, Calif. He graduated from Yale University in 1928, where he received a degree in engineering. He has been associated with the oil-equipment business for nearly 12 years.

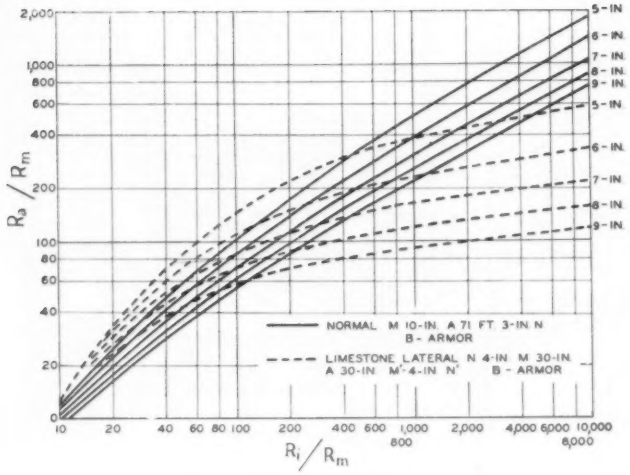


Fig. 1—Simplified resistivity departure curve.

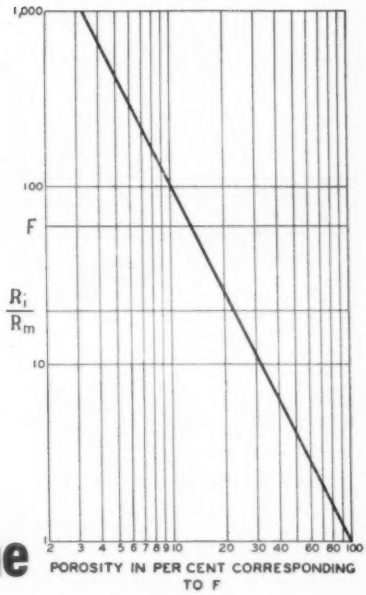


Fig. 2—Porosity index in per cent corresponding to R_i/R_m.

Porosity Index in Limestone

from electrical logs

by M. P. Tixier

PART 1

THIS paper proposes an approach to the problem of porosity determinations in limestone, which permits direct use of a shallow penetration resistivity curve. Generally, the so-called "Limestone Curve," a short symmetrical lateral, is used. Through appropriate application of electrical-log data, a porosity index is mathematically worked out.

This porosity index can be inscribed on the electrical log and immediately permits a determination of porosity in any porous zone through the simple application of a correction factor.

For a long time many people have tried to obtain the porosity of the formations directly from electric logs. A log of successful work has been done, and a few of the methods that have been used will be reviewed here.[1,4,5,6]

To a great extent, the resistivity of the invaded section has been used for the purpose of finding the formation factor, F; and from it the porosity, p, was deduced. A few years ago it was believed that the region surrounding the hole was completely invaded by the mud when the formation was permeable. At that time the invaded zone resistivity was thought to be defined by: $R_i = F R_m$.

It soon became apparent that this was too simple. Residual oil, residual connate water, and colloids remain in the reservoir and produce effects as follows:

Residual-oil effect.—If the formation is oil bearing, some oil is left in the invaded zone; and it has been found that in sands the water saturation in the invaded zone is approximately equal to the square root of the water saturation in the formation before invasion.[1] In other words, $S_i = (S)^{1/2}$, where S = water saturation in the formation before invasion and S_i = water saturation of the invaded zone.

This relation represents a minimum invasion. When the permeability is large and the oil viscosity low, more oil is displaced. This is particularly true in limestone where the water saturation, S_i, appears to be large and does not vary greatly. As a rule, we have found that S_i in limestone is between 65 and 75 per cent.

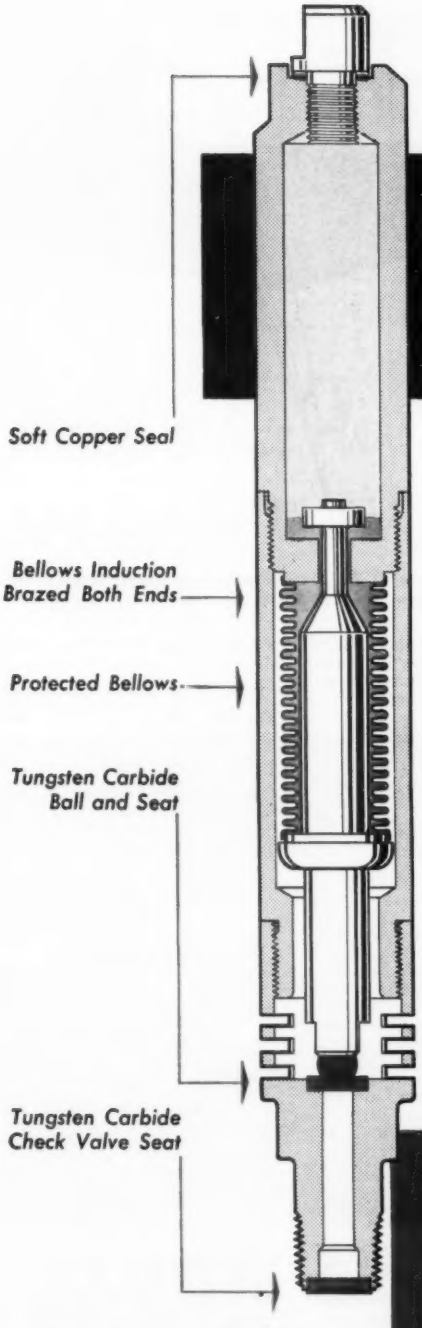
Thus, an average value, $S_i = 70$ per cent, can be taken for the water saturation in the invaded section of oil-saturated limestones.

In fact, the results of the few laboratory determinations on cores that are available tend to support this hypothesis.

Residual connate water and colloid effect.—When the well is drilled with fresh mud, a salt-water-sand well invaded by mud filtrate never gives a resistivity on a small spacing equal to the product of F by R_m. The value measured is always smaller than $F R_m$. It has been explained previously[1] that the conducting medium in the invaded zone is not R_m but R_s which takes a value between R_m and R_w, with R_m the resistivity of the mud and R_w the resistivity of the formation water. The value of R_s can be computed by assuming that the noneffective porosity is filled with connate water of resistivity R_w and that the mud filtrate can only go into the effective porosity.

The noneffective porosity, z, in normally clean sands usually varies between 5 and 10 per cent of the total porosity. Some writers[2,3] prefer to explain this action by colloids instead of connate water, but the action is the same, at least qualitatively speaking. Knowledge of the conditions in limestone is somewhat limited, but approximately the same values for z will be used until more checks are available. It could be shown that $R_s < R_m/2$ when $R_m/R_w > 10$ or when the SP curve is in excess of —100 mv. (See Fig. 2 of "Electric-Log Analysis in the Rocky Mountains."[1])

All of the above reasoning can apply when the resistivity given by a small spacing is at least 10 times that of the mud. In very low-resistivity formations, the usual small spacings are already sufficiently large to permit reading a value closer to R_s than to R_i. For this reason, this study does not apply in low resistivities as are often found in the Gulf Coast and Louisiana. It can be ap-


Soft Copper Seal
Bellows Induction Brazed Both Ends
Protected Bellows
Tungsten Carbide Ball and Seat
Tungsten Carbide Check Valve Seat

INCREASED LIFE FOR FLOW VALVES

Guiberson is *first* to solve the problem of using tungsten carbide for both the ball and seat of its pressure valve, thus insuring longer life.

Intermitting or Continuous Flow with Same Valve now **PROVEN!**

Save Cost in Initial Installation . . . Save Cost in Operation with Guiberson Gas Lift Equipment

TYPE "A"

Guiberson Gas Lift Equipment is protected by the following patents:

2,156,439	2,227,132	2,271,850	2,340,028	2,361,718
2,186,856	2,231,107	2,292,766	2,347,629	2,377,981
2,188,868	2,235,137	2,305,250	2,358,944	2,411,315

Other patents pending.

THE

GUIBERSON

CORPORATION

ESTABLISHED 1919 • DALLAS, TEXAS, U. S. A.

Sold By Leading Oil Field Supply Stores Everywhere

plied to most limestone reservoirs which usually exhibit high resistivities because of high formation factors.

Determination of R_i

Where it can safely be assumed that the invaded zone extends an appreciable distance from the wall of the hole (for instance when $D_i = 5d$),[7] the readings of the limestone curve, with the aid of departure curves for lateral devices, lead to approximations of R_i sufficiently close to the true value of R_i to be useful for the methods outlined.

Determination of R_i is accomplished in using Fig. 1 which is a simplified departure curve graph that has been constructed for the limestone curve, AO = 32 in., and for the small normal, AM = 10 in. It was built from Schlumberger Document No. 3, using the departure curves for no invasion.

For R_i/R_m to be determined, it is, of course, necessary that R_m be accurately known; and this may not always be the case. Where, therefore, there is some doubt that the mud resistivity as measured is truly representative with respect to the conditions at the level of the formations of interest, advantage can be taken of the fact that when a 10-in. normal curve is recorded with a 32-in. limestone curve, the curves will coincide for certain values of R_s/R_m, governed by R_i/R_m (R_i/R_m on the departure charts), hole diameter, and mud resistivity.

Some examples of points of coincidence appear below. Other points of coincidence can always be found by consulting the departure curves for normal and lateral devices.

8¾-in. hole $R_i/R_m = 130$
$R_s/R_m = 66$, approx.

7⅞-in. hole $R_i/R_m = 140$
$R_s/R_m = 80$, approx.

6½-in. hole $R_i/R_m = 200$
$R_s/R_m = 130$, approx.

4½-in. hole $R_i/R_m = 680$
$R_s/R_m = 450$, approx.

For higher values the limestone-curve reading is less than that of the normal curve. For lower values the limestone-curve reading is greater than that of the normal curve. It is important to note here that in field practice the resistivity scales chosen are not always identical for the two curves in question. Therefore, coincidence of resistivity values, and not coincidence of curves, must be used.

Example: If the coincidence of values (R_s) averages 56 ohms for an 8¾-in. hole, we have:

$R_s/R_m = 66$ or $R_m = 56/66 = 0.85$ ohmmeter

This value is the mud resistivity at the temperature corresponding to the level in question. The method permits a good check on the resistivity of the mud, particularly in salt-mud surveys.

It is well to read the average coincident R_s values before determining R_m. The levels of these values may change slightly, particularly in thin beds. The readings on relatively flat portions of the curves are more reliable.

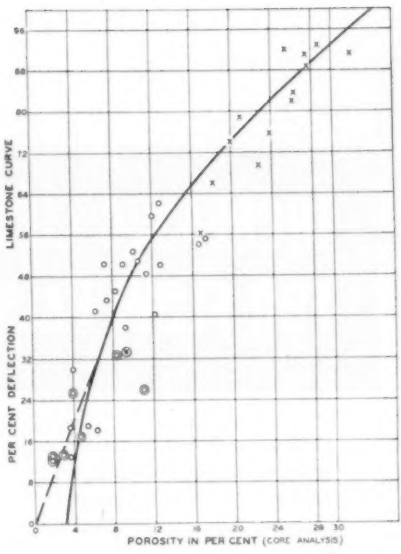


Fig. 3—Curve of actual core porosities (per cent) plotted against per cent deflection of limestone curve.

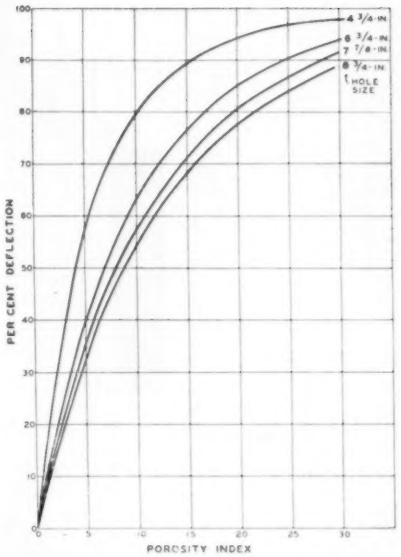


Fig. 4—Computed per cent porosity vs. per cent deflection of limestone curve, various hole sizes in inches.

Porosity vs. Formation Factors

For limestones the porosity can be expressed by:

$$p = (1/F)^{1/2} \qquad (1)$$

The exponent 2 is sufficiently accurate for most requirements. (See Fig. 2.)

The invaded zone resistivity[1] can be written as:

$$R_i = \frac{F \times R_s}{S_i^2}$$

A. Water-bearing limestones:

In this case $S_i = 100$ per cent; thus, $R_i = F \times R_s$ and $F = R_i/R_s$.

1. Salt Muds:

$SP = 0$; $R_m = R_w$

Therefore, we can see that in this case (see Figs. 2 and 3 in "Electric-Log Analysis in the Rocky Mountains"[1]) that:

$R_s = R_m$

Thus, $R_i = F \times R_m$ or $F = R_i/R_m$. From Equation 1:

$$p = (R_m/R_i)^{1/2} \qquad (2)$$

2. Fresh muds:

At this time $R_m > R_w$.

(a) It can be shown again by the "Rocky Mountain" reference[1] that when $SP = -100$ mv. $R_m/R_w \sim 10$ and for $z = 0.075$ $R_s \sim R_m/2$.

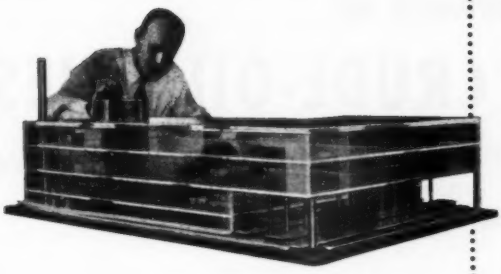
Thus, $R_i = F \times R_s = F \times R_m/2$

or $F = 2\,R_i/R_m$, and

(Continued on page 169)

THE AUTHOR

M. P. Tixier is manager of petroleum engineering for Schlumberger Well Surveying Corp. He has been employed by Schlumberger since 1934, and has worked in the United States since 1935. Prior to his present assignment, Tixier was manager of the Rocky Mountain area. He is a well-known authority on electrical well logging and has authored several important papers on the subject.

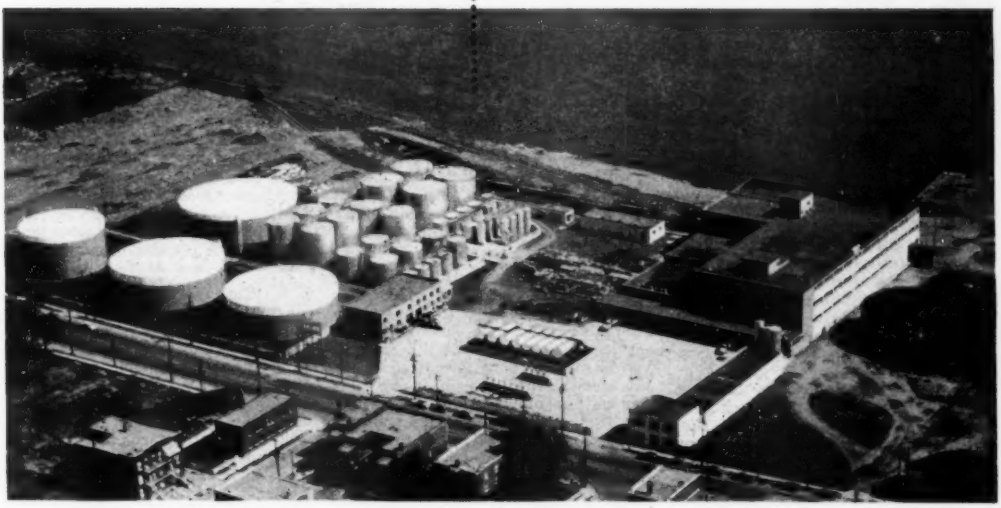


"Model" Grease Plant FOR CANADIAN OIL COMPANIES, LTD.

This lucite, scale model was the "blueprint" used by Fluor engineers to plan and construct the new modern lubricating oil and grease manufacturing plant for Canadian Oil Companies, Ltd., in Montreal. Being able to work out detailed designs in miniature, played a big part in the successful selection and location of all equipment to facilitate the natural flow of work through the plant with a significant saving in man hours. It is an example of the thoroughness with which Fluor tackles a job.

Over 300 varieties of specially engineered greases and lubricants packed in a multitude of sizes, from 3 ounce cans to 55 gallon drums, are manufactured, blended, packaged and stored in this efficient plant. It had to be built in a U-shape to incorporate the original plant which still houses much of the blending machinery. It had to be accessible to all forms of transportation by land or water. It had to provide storage facilities for raw grease stocks before processing and for interior storage of finished products. It had to be equipped with the latest automatic devices for heating, blending, sterilizing, conveying, packaging, handling, etc. and it had to be completed in the shortest time possible.

Fluor's experience with building and remodeling plants which use bulk materials for a variety of products, has long been established, but at Canadian Oil much of the machinery is Fluor designed—especially that used for handling materials. The flexibility of this equipment is almost human in its ability to switch from one type of product to another, from one type of container to another and from one type of carrier to another whether it be truck, box car, tank car, freighter or tanker, without loss of time for change-over.



FLUOR

BE SURE WITH FLUOR

Fluor's Engineering and Construction Division is one of the nation's foremost organizations in plant construction, from design to completion. For more information contact your nearest Fluor district office or representative.

DESIGNERS AND CONSTRUCTORS of Refining, Natural Gas and Chemical Processing Plants.
MANUFACTURERS of Pulsation Dampeners, Mufflers, Gas Cleaners, Cooling Towers and Fin-Fan Units.

THE FLUOR CORPORATION, LTD., 2500 S. Atlantic Blvd., Los Angeles 22, California
New York, Chicago, Pittsburgh, Boston, Tulsa, Houston, San Francisco, Birmingham and Calgary.

REPRESENTED IN THE STERLING AREAS BY: Head Wrightson Processes Ltd., Teesdale House, Baltic Street, London, E.C.1., England

Here are some instructive economics on

CONVERSION OF CRUDE-OIL LINES

to refined-products service

by Earl W. Unruh*

Sinclair Pipe Line Co. in the past 10 years has placed in operation 2,841 miles of refined-products pipe lines. Of these, 1,624 miles are composed of either reconditioned and relaid crude-oil lines, or lines converted in place from crude-oil service to refined-products service.

Having gone through the numerous headaches and problems incident to the use of crude-oil lines for products service, Sinclair Pipe Line Co.'s chief engineer was requested to prepare this report for the 1951 A.P.I. products pipe line technology conference (Atlanta). The paper will give the products pipe-line industry some of the highlights of Sinclair's experiences in this work.

A BRIEF summary of the projects built by Sinclair will show in chronological order the magnitude of converted lines now in products service.

Sinclair started its products pipeline system with the construction of 454 miles of 8 and 6-in. pipe from its Marcus Hook, Pa., refinery. The termini of these lines are Baltimore, Washington, D. C., and Steubenville, Ohio. These lines were constructed with new pipe.

During the past war an 8-in. line was laid at the request of the Petroleum Administration for War from Chicago to Toledo, a distance of 232 miles, to supplement tanker movement on the Great Lakes, which movements are necessarily seasonal. This line was constructed in 1943-1944 with pipe taken up from Sinclair crude-oil service from various points in the Mid-Continent area, wherever 8-in. pipe was available.

Shortly after the war in 1946, an 8-in. line was constructed from Corpus Christi to Austin, Tex., via Victoria and Luling, with a new 6-in. branch line to San Antonio. The pipe for this 8-in. line was reclaimed and reconditioned from the rice fields of South Texas, as well as points in the Mid-Continent area.

Following the construction of the line from Corpus Christi, a line was projected from Houston to Kansas City. The first section of this line from Houston to Arlington (Fort Worth-Dallas area), was constructed of new 10-in. pipe. The section from Arlington to Shawnee, Okla.—a distance of 180 miles, was laid using reclaimed 8-in. pipe having been in crude-oil service in the Mid-Continent area.

From Shawnee to Kansas City, existing sections of 8-in. pipe were isolated and converted to products use in place. This section of the line is 346 miles in length.

In 1949, existing sections of line selected from the newest of the multiple-line crude-oil system were isolated from Chicago to Kansas City. This portion of the system was converted to products use in place using water pressure to blow out pits and weak sections. This was the extent of reconditioning work on the portion of the system converted in place.

Shortly after these sections were placed in operation, sections of line were isolated and converted in place from the Wood River area into Carrollton, Mo., where the line joins with the Chicago-Kansas City section. Upon the acquisition of the Wood River Oil & Refining Co. properties by Sinclair in 1950, this line was placed in products service from Wood River to Carrollton with products being fed into the Kansas City area or the Chicago area as requirements dictate.

The lines described above represent a total of 1,624 miles of products pipe lines either converted from crude service in place or reclaimed, reconditioned and relaid for products use. From the experience gained in these ventures, the author wishes to present some of the physical problems involved as well as an analysis of the economics of this type of construction, with the hope that the material presented may be of some assistance to others who are contemplating similar conversion projects.

*Chief engineer, Sinclair Pipe Line Co., Independence, Kans.

Converting by Takeup and Relaying at a New Location

THE primary consideration in converting a line from crude to products use is to clean the residual black waxy deposits out of the line as quickly as possible.

1. The necessity of running scrapers.—The first procedure is to run a number of scrapers in the crude stream before taking the line out of service. The purpose of this maneuver is obviously to get as much of this deposit into suspension or solution as possible relieving the following products from excessive contamination and discoloration. If the crude line is an old screw-joint line, there will be a considerable amount of paraffin and b.s. which has settled out in the voids in the screw joints. Scrapers help to loosen this paraffin and carry it in suspension into the nearest tank farm or refinery.

If a high-gravity, sour crude oil is available, large tenders of this oil will assist in removing the solidified b.s. It is of prime importance to get as much of the solidified crude-oil products out of the line as possible prior to conversion particularly if the line is to be taken up and relayed. Water displacement will invariably set and harden the waxy components, throwing the burden of cleaning upon the initial tender of solvent and upon subsequent tenders of products.

2. Displacing the oil.—If the crude-oil line to be converted is an integral part of a multiple-line system, a considerable amount of work must be done at each gate plant and pumping station to isolate the line preparatory to take up and reconditioning. To effect this isolation and removal with a minimum of hazards, it is necessary to displace the oil with water. This must of course be done under any circumstances to recover the "line fill" of oil.

Suitable points must be selected where water is readily available from rivers and a connection must be made available for pumping water into the line. Large-volume, high-head portable pumps must be set at these locations. Where possible, several scrapers or "squeegee pigs" should be inserted in the first part of the water stream to insure as complete displace-

Actual Cost of Reclaiming and Relaying Pipe Versus Estimated Cost of New Line

(Estimate based on 8-in. line)

	Reclaimed line	New line
Assumptions:		
Line length, miles	375	375
Throughput capacity—daily—(gasoline), bbl. per day	30,000	30,000
Pumping stations, psi.	8 at 800	5 at 1,280
Wall thickness, in.	0.322	0.250
Construction costs:	—— 1947 Prices ——	
1. Displace oil	$ 20,000	$
2. Take up, haul to yard, and clean (per foot of pipe recovered)	1,090,000	
3. Pit weld and double joint	180,000	
4. Damages (old line)	80,000	
5. Inspection and loading	75,000	
6. Rights-of-way and damage	600,000	600,000
7. Pipe (book value of old line)	260,000	1,980,000
8. Casing, vents, and markers	80,000	80,000
9. Freight	390,000	450,000
10. Installation cost (line pipe)	1,750,000	1,750,000
11. Protective coating	360,000	360,000
12. Cathodic protection	30,000	30,000
13. Tank lines and manifolds	50,000	50,000
14. Pumping stations	960,000	600,000
15. Tanks	250,000	250,000
16. Real estate	37,000	25,000
17. Communication system	250,000	250,000
18. Vehicles and work equipment	20,000	20,000
19. Supervision and engineering	200,000	200,000
1947 prices, total est. cost	$6,682,000	$6,645,000
1947 prices, est. cost per mile	$ 17,800	$ 17,700
1947 prices, est. cost per ft.	$ 3.37	$ 3.35
1951 prices, est. cost	$7,800,000	$8,000,000

Comparison of Operating Costs, Reclaimed Pipe Versus New Line

(Estimate based on 8-in. line 375 miles in length)

	Reclaimed pipe	New line
Number of stations	8	5
Capacity:		
Bbl. per day	30,000	30,000
Bbl. per year	10,950,000	10,950,000
Estimated operating costs per year:		
Personnel	$ 393,000	$ 313,000
Power	314,000	304,000
Maintenance	42,000	33,000
Corrosion	3,000	3,000
Vehicles and other work equipment	8,000	8,000
Supplies	24,000	15,000
General administrative expense	45,000	45,000
Interest at 1⅓ per cent average	127,000	130,000
Misc. taxes at 1½ per cent	117,000	120,000
Total operating cost per year	$1,073,000	$ 971,000
Depreciation at 5 per cent	390,000	400,000
Total operating cost incl. depr.	$1,463,000	$1,371,000
Transportation tax	200,000	200,000
Total oper. cost. incl. depr. and trans. tax	$1,663,000	$1,571,000
Cost per barrel—mile:		
Before depreciation	$ .000262	$ .000237
Incl. depreciation and transportation tax	$ .000407	$ .000383

ment of the oil as possible. The oil should be displaced into the nearest available tank where the oil-water mixture can separate and the water can be drawn off and disposed of. It is needless to say that this operation must be carried out during the time of the year when all danger of freezing is past.

3. Disposal of contaminated water. The problem of disposal of the water at the time of takeup of the line is serious, particularly in cultivated areas. Compressed air to displace the water is extremely dangerous since there is usually enough oil remaining in the line to form explosive vapor-air mixtures. The water will carry a film of oil. A thorough knowledge of the profile of line is necessary. The line must be cut or parted at the low points where water drainage can run off without damaging land or contaminating streams or water reservoirs. The line must also be tapped at high points to allow air to enter it.

4. Takeup and reconditioning operations.—Preparing to remove the line for reconditioning involves the usual stripping of the cover either by a ditching machine, back hoe, or rooter. If it is a screw-joint line, the collars must be cut with a torch. The pipe may be pulled up with a sideboom tractor after the earth covering has been stripped away. Care must be exercised to avoid as much unnecessary bending of the pipe as possible since straightening operations are costly and time consuming.

The pipe must be loaded and hauled to a central cleaning and reconditioning yard located at a railroad spur if it is to be shipped long distances. At this point the pipe is straightened if necessary and run through a cleaning machine. A most satisfactory machine for yard cleaning has been developed by Sinclair. After cleaning operations, the pipe must be inspected and graded, being marked for pit-welding operations.

At the time of pit welding, the ends which were threaded are cut off, and in the same operation the pipe is beveled for welding. The length of the screw-joint pipe is ordinarily 20 ft. per joint. To economically handle the pipe for shipment and relaying, it is double jointed by welding in the reconditioning yard. After final inspection, the pipe is loaded for transshipment to location of the proposed products pipe line. Sinclair's experience on takeup and reconditioning shows that approximately 85 to 90 per cent of the pipe can be salvaged for relaying.

5. Economics of reclaiming and reconditioning pipe vs. new pipe.—During recent times numerous considerations other than pure economics have entered into the decisions to use reclaimed lines. During the last war as well as in the present state of emergency, the problem of the availability of steel especially in smaller sizes or pipe is a serious consideration. Later in the discussion in this paper, an attempt will be made to evaluate the construction costs of a reclaimed line in terms of time gained as compared with waiting for new pipe to construct a line.

It should also be pointed out that it is difficult to obtain the same hydraulic line efficiency with reclaimed pipe that is possible with new pipe particularly if there has been some internal corrosion while in crude-oil service.

It should also be noted from the accompanying estimate of operating costs that the limiting maximum allowable operating pressure of 800 psi. increases installation costs as well as operating costs considerably.

It will be noted in the tabulation that the actual construction figures available cover the costs of construction during 1947 and 1948 as shown in the first column. In the second column are reflected costs estimated for new line construction. At the bottom of the tabulation is an estimated price increase index for 1951 as compared to 1947, to bring the comparison up to date.

Actual Cost of Reconditioning Old Pipe Line Versus Estimated Cost of New Line

(Estimate based on 8-in. line)

	Reconditioned line	New line
Assumptions:		
Length of line, miles	375	375
Throughput capacity—daily—(gasoline), bbl. per day	30,000	30,000
Pumping stations, psi.	8 @ 800	5 @ 1,280
Pipe-wall thickness, in.	0.322	0.250
Construction costs:	— 1947 Prices —	
1. Cost of displacing oil, pressure testing, replacing or repairing defective pipe	$ 337,000	$
2. Damages (old line)	80,000	
3. Rights-of-way and damage, new line		600,000
4. Pipe (book value of old line)	260,000	1,980,000
5. Casing, vents and markers		80,000
6. Freight		450,000
7. Installation cost (line pipe)		1,750,000
8. Protective coating		360,000
9. Cathodic protection	750,000	30,000
10. Tank lines and manifolds	50,000	50,000
11. Pumping stations	960,000	600,000
12. Tanks	250,000	250,000
13. Real estate	37,000	25,000
14. Communication system	250,000	250,000
15. Vehicles and work equipment	40,000	20,000
16. Supervision and engineering	200,000	200,000
1947 prices, total est. cost	$3,214,000	$6,645,000
1947 prices, est. cost per mile	$ 8,560	$ 17,700
1947 prices, est. cost per foot	$ 1.63	$ 3.35
1951 prices, est. cost	$3,800,000	$8,000,000

Comparison of Operating Costs Reconditioned Pipe Line Versus New Line

(Estimate based on 8-in. line 375 miles in length)

	Reconditioned line	New line
Number of stations	8	5
Capacity:		
Barrels per day	30,000	30,000
Barrels per year	10,950,000	10,950,000
Estimated operating costs per year:		
Personnel	$ 443,000	$ 313,000
Power	314,000	304,000
Maintenance	100,000	33,000
Corrosion	37,000	3,000
Vehicles and other work equipment	16,000	8,000
Supplies	24,000	15,000
General administrative expense	55,000	45,000
Interest at 1¾ per cent average	62,000	130,000
Miscellaneous taxes	117,000	120,000
Total operating cost per year	$1,168,000	$ 971,000
Depreciation at 5 per cent	190,000	400,000
Total operating cost incl. depr.	$1,358,000	$1,371,000
Transportation tax	200,000	200,000
Total operating cost incl. depr. and trans. tax	$1,558,000	$1,571,000
Cost per barrel—mile:		
Before depreciation	$ .000285	$ .000237
Including depr. and trans. tax	.000380	.000383

Converting a Line in Place

1. Preparation

AS in the case of a line being prepared for takeup, the conversion of a line from crude to petroleum products in place requires the displacement of the oil by water. The same general preparations described in preparing for takeup of a line are necessary when converting in place. After having run the necessary scrapers and having displaced the crude oil, it is then necessary to isolate the line by cutting it out of existing manifolds and crude pump stations. The lines should be pressure tested with water after alterations and changes have been completed.

It was found impractical to attempt to carry this test above 900 psi. since most of the reclaimed pipe utilized was taken from lines laid prior to 1926. Most of the pipe laid at this time was lapweld pipe. After reaching a pressure of 900 psi., fatigue stresses in the old lapweld seams were apparent. It was found that the pipe would not hold this pressure for any length of time.

On the line which was constructed between Chicago and Toledo, it was impossible to get the line to hold above 850 psi. When this line was placed in operation, a maximum operating pressure of 800 psi. was established. Automatic controls and safety devices were set to control at 800 psi. and shut the pump stations down if the pressure exceeded 820 psi. This line has been operating satisfactorily on this basis for approximately 7 years.

2. Hydraulic consideration

In contemplating the use of reclaimed pipe for a products line, it is extremely important to consider the route to be traversed. In an area where mountainous terrain is encountered it would be folly to consider the use of reclaimel lapweld pipe where great static elevation differences exist or where dangerous surges occur. It is an economic necessity to operate a reclaimed line with a very narrow margin of safety factor in order to maintain the highest throughput volume possible.

Present-day trends dictate fewer pumping stations, higher pressures, and more automatic equipment; therefore, it is vital to get an accurate profile and the best hydraulic balance possible in the location of pumping stations. Only in this manner can a reclaimed line economically approach the operations possible with a new line.

3. Limitations

(a) Corrosion problems in converting a line in place to products service.—In all probability the line to be converted will be an old line, uncoated, and subject to galvanic and stray-current corrosion. To protect a bare line in place from corrosion is a tremendous undertaking. It is infinitely more of a problem if the converted line is one of many bare parallel lines.

To cut down on rapidly pyramiding costs due to corrosion leaks, Sinclair has within the past few years undertaken a stop-gap measure of installing sacrificial anodes on a major portion of its extensive crude-oil trunk system. This system consists of many bare parallel lines, one of which has been converted to products service from Shawnee, Okla., to Chicago. The company has maintained accurate leak records for at least 15 years which readily indicate "hot spot" areas. It is from these records and information derived therefrom that locations were selected for anode installations through known corrosive areas. Anodes were placed at a frequency of one anode per line every 50 ft. through corrosive areas.

The stop-gap program should be completed this year. Anode life of

Bethlehem 600...the pump with the fluid end for extra-high pressures

That old reliable of deep-well slush pumps, Bethlehem's 600, is now equipped with a new, superstrong fluid end to handle the pressure extremes so common in modern drilling. The new parts are thicker, more massive; you can appreciate their great strength merely by looking at them.

Even a brief study of this pump will show readily why it withstands high pressures with absolute safety. Just as a starter, consider the gaskets. They're A.P.I. metal-ring type on valve covers, suction and discharge flanges, and stuffing boxes.

But that isn't all. Cylinder walls are heavier. Valve covers too. And the air chamber. Every last part is designed and built for highest pressures.

Why not let us give you full details? There are so many other features you should know about—complete oil-bath lubrication, roller-bearing construction throughout, etc. Call our nearest office; we'll see that you're furnished at once with all the information you need.

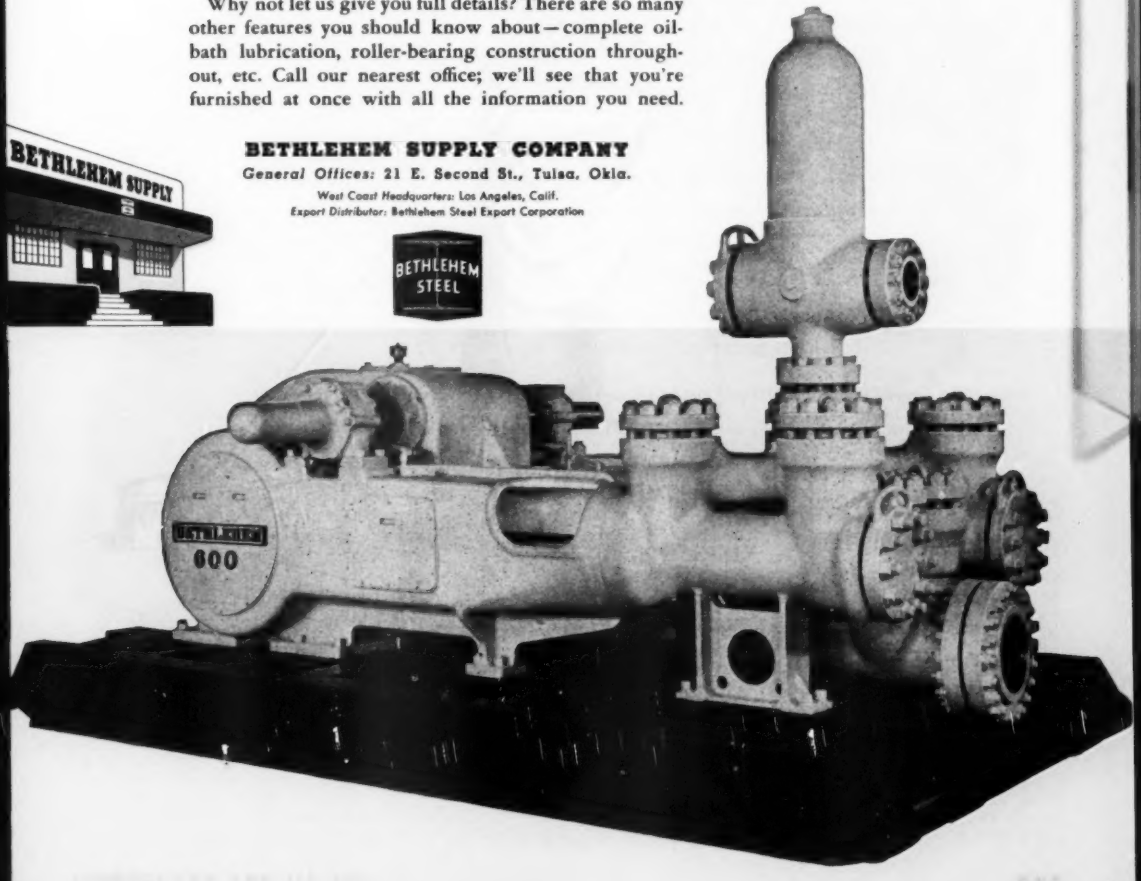
BETHLEHEM SUPPLY COMPANY

General Offices: 21 E. Second St., Tulsa, Okla.

West Coast Headquarters: Los Angeles, Calif.

Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL



A CLEAN SWEEP
SCHMERLER

ANOTHER WAY OF SAYING UOP SERVICE IS COMPLETE

Even the charwoman reminds us — UOP Service makes a *clean sweep* through every phase of process development and plant operation . . . and continues on "after hours," after the refinery is on stream.

It's a service *complete* in every detail, including laboratory research, pilot plant work, economic evaluations, engineering, construction supervision, licensee instruction, and equipment inspection. In addition, UOP field men — familiar with refinery operations all over the world — are available, on request, to aid in maintaining day-to-day operating efficiency.

As a comprehensive form of protection, UOP Service helps avoid losses due to interruptions in your planned program of operation.

UNIVERSAL OIL PRODUCTS COMPANY

UOP®

General Offices: 310 S. MICHIGAN AVE., CHICAGO 4, ILL., U.S.A.
Laboratories: RIVERSIDE, ILLINOIS

Universal Service Protects Your Refinery

from 6 to 10 years has been estimated from spot checks of soil resistivity on the installations completed. It was necessary to speed this installation since corrosion costs had reached the appalling figure of 1½ million dollars per year. This estimated cost is based on a total of over 3,000 leaks in 1949, or more than 8 leaks per day, costing approximately $500 per leak. It is hoped this tremendous cost can be cut very substantially showing a quick return on the investment of the anodes installed.

To return the investment in anodes, a reduction of only 500 leaks per year for a period of 2 years is required to pay for the cost of the anodes installed on a rush basis. During the year of 1950 in which a large percentage of the anodes were installed, a substantial reduction of 400 leaks was affected. The results should be even more encouraging in successive years for the duration of the estimated life of the anodes.

(b) Collars and collar leaks. — Old screw-joint lines when placed in products service can be expected to develop collar leaks. Collars which long ago leaked small amounts of crude oil but which were sealed off due to wax deposits will undoubtedly again start leaking because of the solvent action of the gasoline, kerosine, and other products transported. Product losses may not be excessive through these leaks but the maintenance and repair problem is gigantic. The collars must be caulked as well as possible and then must be welded on both sides. It will be difficult to obtain a satisfactory weld without pin holes due to the gases formed by seeping products.

(c) Specifications in cleaning the interior of a crude line.

1. Scrapers, water, and solvents.— After running quantities of scrapers in the crude oil and displacing the crude oil with water, the problem still remains of removing the adhering wax, b.s., and other deposits collected during the years the line was in crude-oil service.

It has been Sinclair's practice to displace the water with a tender of approximately 25,000 bbl. of kerosine. Kerosine has been found to be an excellent solvent for the deposits remaining in the line. The contaminated kerosine can be rerun in the nearest refinery at a nominal cost. Sinclair products pipe line system is integrated with its refineries which enables the movement of the contaminated first tender of products to the nearest refinery. Following the initial tender of solvent, only those products which cannot be seriously damaged by an increase in gum content or off-color specifications should be handled. At least 100,000 bbl. of No. 2 or No. 3 fuel oil should be handled after the initial kerosine tender before attempting to run any gasoline.

2. Problems of color.—It has been found that water-white kerosine which must meet stringent color specifications cannot be handled without loss of several points on the color range until at least 2,000,000 bbl. of products has passed through the line. Very close records of color loss and quantities of products handled were kept in an attempt to determine when it would be safe to ship high-grade water-white kerosine. It was found in running these tests and analyzing samples that not only was the residue of hydrocarbons to be blamed for the color damage but also very fine rust and mill scale which had been formed in crude operation was responsible for a large amount of the color damage. After the film of wax had been dissolved and mill scale and existing rust had been removed, it was quite apparent that the addition of Sinclair RD 119 internal corrosion inhibitor assisted materially in clearing up any further internal corrosion of the line.

3. Mill-scale removal and strainer design.—After a period of operation during which the wax film was removed, the original mill scale and some apparent corrosion products which had been formed during the early part of the crude operation were collected in strainers at each pumping station. In fact, for a period of

(Continued on page 155)

Type 1-B Seal Meets Most Requirements. This balanced seal will give outstanding sealing performance on practically all of your petroleum services, including the effective, leak-proof sealing of inflammable Butane, Propane and other light hydrocarbons, where pressures do not exceed 500 psi. The Type 1-B Seal may be easily installed on rotating shafts of centrifugal pumps. Their unique balanced design insures safe pump operation.

Type 8-B Seal for High Pressure Applications. The Type 8-B Balanced Seal offers the same service and safety advantages as the Type 1-B Seal, but is designed to operate efficiently at pressures as high as 1000 psi. There are a large number of refinery applications for this heavy-duty seal. Both the Type 1-B Seal and the Type 8-B Seal are recommended for temperatures to 250°F. and speeds up to 6000 feet per minute.

JUST OFF THE PRESS!

Write today for new illustrated bulletin giving complete facts on these two seals.

CRANE PACKING COMPANY

JOHN CRANE

Houston: 6026 Supply Row, Houston 11, Texas
Chicago: 1819 Cuyler Ave., Chicago 13, Ill.
Los Angeles: 140 North Marina Ave., Wilmington, Calif.

Offices in All Principal Cities in United States and Canada

JOHN CRANE

SERVICE LEDGER
1901-1951

ANGLO-IRANIAN OIL CO. LTD.
ARGENTINE GOVERNMENT OIL FIELDS
ARGENTINE MINISTRY OF WAR
ATLANTIC REFINING CO.
ATOMIC ENERGY COMMISSION
BRITISH AMERICAN OIL CO. LTD.
CANADIAN OIL REFINERIES, LTD.
CALIFORNIA REFINING CO.
CHAMPLIN REFINING CO.
CIE. DE RAFFINAGE SHELL-BERRE
CIE. FRANCAISE DE RAFFINAGE
CIE. INDUSTRIELLE DES PETROLES
CITIES SERVICE OIL CO.
CITIES SERVICE REFINING CORP.
COLGATE-PALMOLIVE-PEET
CONSOLIDATED REFINERIES, LTD.
CONTINENTAL OIL CO.
CORY BROTHERS & CO., LTD.
CREOLE PETROLEUM CORP.
DIAKEL CORPORATION
EL DORADO REFINING CO.
ESSO STANDARD OIL CO.
GENERAL PETROLEUM CORP. OF CALIFORNIA
GLOBE OIL & REFINING CO.
GULF OIL CORP.
HUMBLE OIL & REFINING CO.
IMPERIAL CHEMICAL INDUSTRIES
IMPERIAL OIL LTD.
KANOTEX REFINING CO.
KENDALL REFINING CO.
LEVER BROS.
LION OIL CO.
MAGNOLIA PETROLEUM CO.
MARINE OIL REFINERS OF AFRICA, LTD.
MATHIESON CHEMICAL CORP.
McCOLL-FRONTENAC OIL CO., LTD.
MID-CONTINENT PETROLEUM CORP.
MITSUBISHI OIL CO., LTD.
NATIONAL PETROLEUM COUNCIL OF BRAZIL
PAN AMERICAN REFINING CORP.
PENNZOIL CO.
PHILLIPS PETROLEUM CO.
POLYMER CORP., LTD.
PURE OIL CO.
SHELL CHEMICAL CORP.
SHELL OIL CO.
SHERWIN-WILLIAMS CO.
SINCLAIR REFINING CO.
SKELLY OIL CO.
SOCIETE DES RAFFINERIES DE PETROLE DE LA GIRONDE
SOCIETE GENERALE DES HUILES DE PETROLE
SOCIETE INDUSTRIELLE BELGE DES PETROLES
SOCONY-VACUUM FRANCAISE
SOCONY-VACUUM OIL CO.
E. R. SQUIBB & SONS
STANDARD OIL CO. (INDIANA)
STANDARD OIL CO. (OHIO)
STANDARD OIL CO. OF CALIFORNIA
SWIFT AND CO.
TEXAS CO.
UNION OIL CO. OF CALIFORNIA
UTAH OIL REFINING CO.
WASATCH OIL CO.
WOOD RIVER OIL & REFINING CO.

Canada's First and Canada's Largest Cat Crackers... for Imperial!

Imperial Oil Limited placed its first order for process equipment with Kellogg back in 1938. This initial order was for a combination topping and thermal cracking unit. In succeeding years, Kellogg-engineered delayed coking, thermal reforming and alkylation units followed.

In 1948 Imperial put Canada's first Fluid catalytic cracker on stream at Montreal...a unit engineered and constructed by Kellogg. In June of this year, another Fluid unit was completed by Canadian Kellogg at Imperial's Winnipeg refinery.

Today, Canada's largest catalytic cracking unit—a 25,000 BPD Fluid unit—is going up at Sarnia, Ontario. Canadian Kellogg is engineering and constructing this cracker as well as a new two-stage distillation unit with a capacity of 50,000 BPD... also Canada's largest.

THE M. W. KELLOGG COMPANY
A SUBSIDIARY OF PULLMAN INCORPORATED

for fifty years an integral part of processing history

NEW YORK JERSEY CITY LOS ANGELES TULSA HOUSTON TORONTO LONDON PARIS

KELLOGG
1901-1951

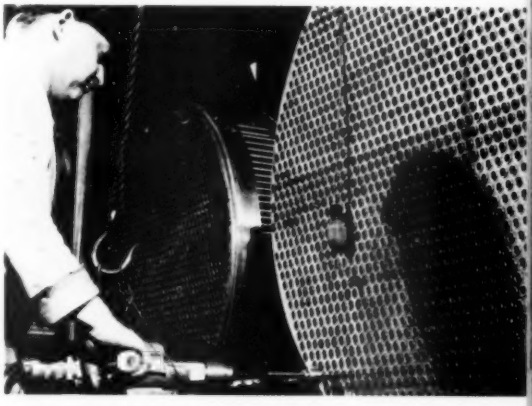
Portrait at

This year is Kellogg's fiftieth of service to industry. At this time naturally, as a group of men—known collectively to the modern business world as The M. W. Kellogg Company—we can think back nostalgically. We can remember the chimney stacks

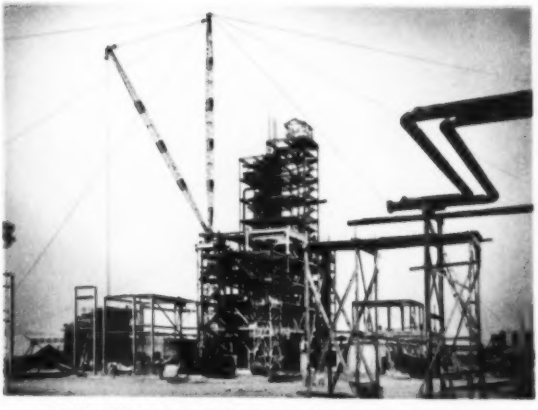
"Construction's battle with time!"

In previous issues of this magazine, "camera portraits" of M. W. Kellogg today have highlighted major aspects of Kellogg's research, development, engineering, procurement and fabricating activities.

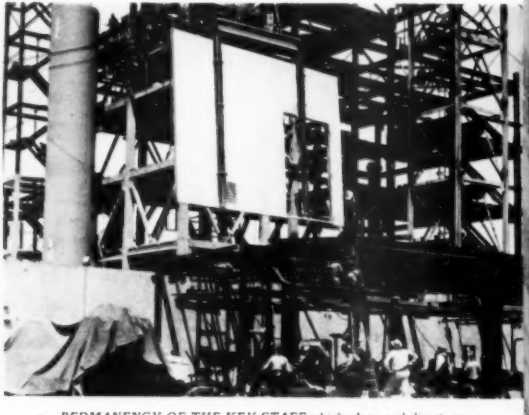
This month, the camera picks up the tour on the floor of the Heat Exchanger Shops in Jersey City. From there it swings to the construction lot, focussing on some of the techniques Kellogg utilizes in its continuing "battle with time."



1. *HEAT EXCHANGER FABRICATION*, in essence a combination of piping and vessel fabrication, is another major activity in the shops. Here in the assembly section of the Exchanger Shops, the most modern type of electronic control roll-in equipment is used. Kellogg heat exchangers in service run the gamut of size . . . from 6-inch outside diameters to 13 foot diameter shells containing 8,000 tubes.



4. *NOW TAKEN FOR GRANTED* in major plant construction, the towering guy derrick was first introduced in the field by Kellogg construction engineers. The cumulative industry-wide savings—both in time and money—resulting from this one construction innovation are illustrative of the results achieved by constant efforts to improve methods and equipment.

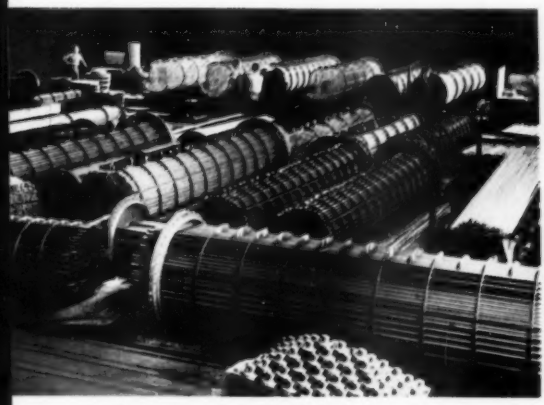


5. *PERMANENCY OF THE KEY STAFF* which plans and directs construction activities . . . and close day-to-day integration with the design engineering staff are responsible for the company's improved methods in the field. The adoption of the "pre-fab" assembly line on the refinery site (that's a whole pre-fab wall in the air) is one of the unusual techniques pioneered by Kellogg construction crews.

Fifty... no. 10

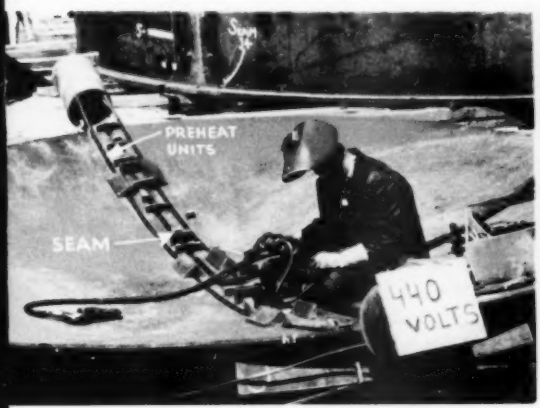
KELLOGG
1901-1951
50th Anniversary

we built in 1901 . . . the first crude vessels for oil refiners in the 'teens . . . our first combination unit . . . the forty-odd Fluid cat crackers built in these years. But, after all, The M. W. Kellogg Company is only a factor as it is able to serve industry today. For that reason, we are presenting this series of monthly camera studies which document our belief that a truly integrated organization can better serve industry to achieve greater earning power. This is No. 10 in the series.

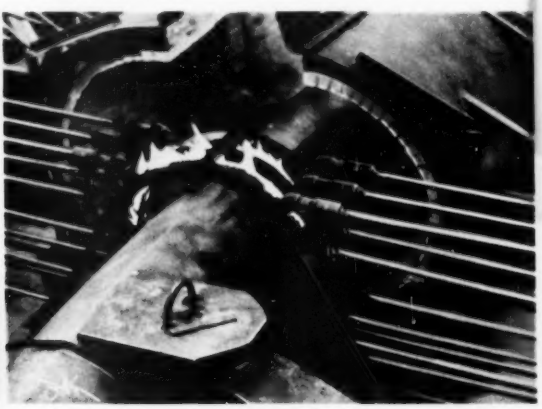


2. *TYPICAL OF THE ASSORTMENT* of exchangers that might be found on the Shop floor on any given day . . . these units represent applications varying from pressures of 5,000 pounds per square inch at temperatures of 1100° F. to high vacuum service at below freezing temperatures of the order of liquid oxygen. Final destination . . . a job site.

3. *ON THE JOB SITE* the same principles employed in engineering and fabrication—detailed planning, efficient tools (created if necessary), constantly modernized techniques, experienced supervision—all pay off in reduced costs and shortened construction periods. The company's permanent construction staff is large . . . can handle as many as forty major construction projects at one time.



6. *ANOTHER RESULT* of close integration in the Kellogg organization is that the precise quality methods used in plant practice are quickly adopted for field use. This is true particularly of welding practices—such as induction pre-heating shown here—which are continually improved as more and more is learned about the behavior of metals.



7. *IN SOME INSTANCES* in field construction, it pays to do most of the pipe bending in the field, and Kellogg's job site, pipe bending set-ups are virtual miniatures of the company's extensive shop operation—from equipment to methods. Piping up to 36 inch diameter has been successfully and economically bent in the field.

NEXT MONTH

. . . in the eleventh and final edition of this series of "camera studies" of M. W. Kellogg today . . . the camera finishes its tour of the construction lot and focusses on the overall picture of Kellogg's service to industry.

Bent to beat stress corrosion!

To resist temperature, pressure and chemicals use

M. W. KELLOGG

In high temperature operation, stress corrosion has been found to be particularly aggravated adjacent to latitudinal weld seams in segmented pipe bends. Kellogg's exclusive method of incrementally bending pipe up to 96" in diameter provides bends that have no latitudinal welds in the arc . . . that present an even contour throughout their length.

Pressure Vessels
Vacuum Vessels
Fractionating Columns
Drums and Shells
Heat Exchangers
Process Piping
Hi-pressure—Hi-temp Power Piping
Bends and Headers
Giant One-Piece Bends
Forged and Welded Fittings
Radial Brick Chimneys

Special Studies of unusual problems such as stress corrosion and graphitization to assure long life and low maintenance.

Exclusive Equipment for accurately analyzing stresses in piping and providing unique data for critical installations.

Top Welding Performance in shops and in the field by welders accustomed to working under X-ray checks.

Metallurgical Research by recognized specialists who have made major contributions in this field.

Complete Facilities for the fabrication of steel products from simple forgings to specially cast bimetallic devices.

Rigid Quality Control, devised by specialists, including chemical and micro analyses as well as mechanical and non-destructive testing.

NEWS FOR OPERATORS IN WESTERN CANADA!

Canadian Kellogg Company has established complete shop facilities for the fabrication of all types of piping at **EDMONTON** in Alberta Province. Inquire directly or through any Kellogg office.

The M. W. Kellogg Company *(A Subsidiary of Pullman Incorporated)* **New York, Jersey City, Los Angeles, Tulsa, Houston, Toronto, London, Paris**

a few months, the problem of scale removal was so serious that scrapers which were being used became stuck behind masses of mill scale and corrosion products in the line. This condition cleared up in a matter of 2 or 3 months after products operations began. Inhibitor RD 119 has effectively eliminated further internal corrosion problems to the extent that elaborate strainers placed in the pump stations to catch this mill scale could be removed and salvaged for future installations. The inhibitor is effective not only throughout the pipe-line system but protects consumers' equipment as well.

A new type of strainer was developed which takes care of small quantities of scale which still continued to break loose from the interior surface of the pipe in diminishing quantities. A cutaway view of this strainer is shown in Fig. 1. This type of strainer has enabled Sinclair to eliminate a large quantity of valves previously required and has streamlined the appearance of the piping layout.

The new type strainer is placed in the scraper trap which can be opened by means of a "Unibolt" coupling and the strainer can be removed and replaced in a matter of a few minutes. The strainer has been designed so that in the event a scraper is being run it can pass into the inside of the strainer basket with ease and can be removed with the scraper basket.

(d) Economics of converting a line in place.—The accompanying tabulation will show the economics of converting a crude line to products service in place without removal for reconditioning. The only reconditioning which must be performed is in repair of leaks which occur during water pressure tests. It was extremely fortunate that in a number of cases Sinclair had existing crude lines traversing a route along which a products line was proposed. By converting the line in place, it will be seen from the following tabulation that the tremendous cost of takeup and reconditioning as well as relaying of a line was eliminated. The transfer in this case was merely a book transaction.

Present Day Trends

1. Large crude lines: (a) Release of smaller lines for products use.—Present-day trends in the construction of crude-oil pipe lines has been toward larger-diameter crude oil lines which can be economically operated, effecting a great saving in transportation costs. In the construction of these large-diameter lines, there is the general trend to abandon or reclaim previously constructed smaller lines. Due to the shortage of steel, numerous companies will be faced with the necessity of utilizing the smaller crude lines from 6 to 12 in. in size for refined products use either by reclaiming the pipe or by converting the line in place.

Although the trend in products operation is always moving toward higher pressures and more cooperative ventures, most companies will be faced as Sinclair has been during and immediately following the past war with the decision to either defer their plans until steel for new high-pressure lines can be made available or plunge into a program of products-pipe-line construction with reclaimed pipe.

The accompanying tabulation is an attempt to theorize on the economics of building a pipe line immediately from available reclaimed steel or waiting a period of several years until new pipe can be made available. The time gained in moving into a new marketing area, becoming firmly entrenched, and enjoying freight savings must be carefully weighed in comparison to absorbing high transportation costs and waiting until new steel is available.

2. Steel efficiency new pipe vs. old pipe.—The following tabulation is an attempt to evaluate the total steel efficiency of a reclaimed or converted pipe line as compared with one constructed with new high tensile steel. It will be seen from this tabulation that new high tensile steels either electric weld or seamless will allow a

RED DEVIL

SLUSH PUMP VALVES

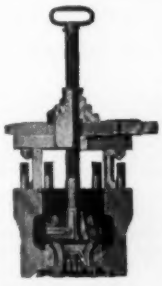
For high pressure abrasive service

In the manufacture of Red Devil Valves, particular emphasis has been given to HIGH PRESSURE ABRASIVE SERVICE at lowest possible operating costs. Their design is unique in simplicity, having only 5 parts. Valve and Seat are drop forged for maximum strength and processed for a deep high-carbon case to withstand excessive abrasive action. Seat has the least possible flow restriction and flat surface on bottom provides easy removal with Valve Seat Puller. "DIA-TEX" Inserts are Oil and Heat Resistant and can be reversed when worn on one side to double their long service life.

Write for Catalog No. P-110.

SPRING LOCK WASHER | VALVE INSERT PLATE | REVERSIBLE "DIA-TEX" VALVE INSERT | VALVE | VALVE SEAT

RED DEVIL VALVE SEAT PULLER



Provides a fast and positive means for pulling badly stuck valve seats by gripping the bottom rim of the seat. Eliminates the expense and hazards of removing seats with a cutting torch. All parts are made of highest grade alloy steel. Write for Catalog No. P-111.

CONSULT YOUR COMPOSITE. For full information on Red Devil Valves, Pullers and other Products, see Composite Catalog or write for price catalogs noted above. Red Devil Products are available through your supply store.

OIL WELL MANUFACTURING CORP.

6002 South Alameda St., Los Angeles 1, California

Savings to Be Effected by Building Reclaimed Line or Converting Vs. Waiting for New Steel

	New line	Reclaimed line	Converted line
Construction costs, per year	$8,000,000	$7,800,000	$3,800,000
Out-of-pocket operating costs	$ 971,000	$1,073,000	$1,168,000

ESTIMATED FREIGHT SAVINGS

Rail or truck movement—375 miles—per bbl.	$1.00
Pipe-line tariff—375 miles—per bbl.	37.5c
Estimated savings, per bbl.	62.5c

SAVINGS

Volume—	Per day	Per month	Per year
30,000 bbl. per day	$18,750	$562,500	$6,750,000
20,000 bbl. per day	12,500	375,000	4,500,000
15,000 bbl. per day	9,375	281,250	3,375,000

In 10 years, difference in operating costs amounts to $1,000,000, as between the new line and the reclaimed line. Difference between new line and the line converted in place, approximately $2,000,000. Assuming the time gained in not waiting for new steel to be 2 years, the savings in freight as shown in the above tabulation will completely offset the higher operating costs of a 10-year period in approximately 2 months and 4 months respectively on the reclaimed and converted lines based on a maximum capacity of 30,000 bbl. per day.

trend toward lighter weight pipe providing same are adequately protected with a cathodic protection program.

From the foregoing record of Sinclair's experience in converting and reclaiming crude oil lines for products service, it can be seen that a number of problems are involved. The major consideration is of course the economics of the venture. The reclaimed and converted lines will not allow high-pressure operations, therefore requiring a greater number of pump stations with the accompanying high investments, greater power costs, and a greater requirement for manpower. The problem of cleaning out deposits remaining in crude lines is serious. It is necessary to transport large volumes of refined products before the last traces of this contamination have disappeared. The problem of maintaining specifications of products under these conditions is difficult and management must be cognizant of this problem.

In reviewing operations, greater maintenance and repair costs will be found on converted products pipe lines. The future policy of most major companies in considering the use of larger crude-oil lines will release smaller lines, which in turn can be reconditioned for use in products service. The economy of operation is necessarily in favor of new steel and high-pressure operation; however, companies faced with large quantities of reclaimed pipe must weigh the cost of abandoning these lines against their use in products service compared to the purchase of new steel. The effect of the present emergency, should it become aggravated, will no doubt have a great bearing on the future consideration of all companies of the utilization of old crude lines for refined products use.

Recommendations

1. Concerning lapweld screw-joint lines.—It is Sinclair's recommendation that if it is necessary to use a line which was constructed in the era of screw-joint construction, that great care be exercised in welding the collars of such a line and that operating pressures be held substantially below water-test pressures.

2. Concerning welded lines.—If the line to be converted is of welded construction, the problems will be infinitely less than those encountered with a screw-joint line. The cleaning operations will be much easier. There will be far fewer voids which have been filled with waxy hydrocarbon components. If such a line is available for conversion to products use, there should be no hesitation in converting same.

Pipe Comparisons

In the study presented here, pipe comparisons for alternatives discussed are as follows:

GRADE X-42 LINE PIPE

Size line	Wall thickness	Tons per mile	Min. yield strength (psi.)	Ultimate bursting strength (lb.)	Safety* factor (psi.)
8⅝-in. (old pipe)	0.322	75.37	850	850	1.06 at 800
8⅝-in. (new)	0.250	59.03	2,435	3,479	1.90 at 1,280
8⅝-in. (new)	0.188	44.62	1,831	2,616	1.43 at 1,280

*Safety factor based on minimum yield strength.

In cold-rolling operations such as used on electric weld pipe, it can be safely assumed that X-42 plate gains tensile strength both in transverse and longitudinal section. It is reasonable to assume then that X-42 plate becomes X-46 minimum pipe through cold working of the steel. Based on this assumption the new safety factors would be as follows:

GRADE X-46 PIPE

		Safety factor
8⅝-in. o.d.	0.250-in. wall	2.075 at 1,280 psi.
8⅝-in. o.d.	0.188-in. wall	1.56 at 1,280 psi.

Saving in tons for 375-mile line (0.250-in. wall) = 6,127 tons = $765,875.
Saving in tons for 375-mile line (0.188-in. wall) = 11,531 tons = $1,441,375.

Development in Hugoton Gas Field

(Continued from page 133)

of absorption oil by refluxing the top section of the still with a portion of the products from the still after they have been condensed and cooled.

The propane, butane, and natural gasoline are separated and purified from the still overhead product mixture by means of three fractionators. The depropanizer fractionator separates the propane as an overhead product. Propane from this column has a purity of 98 to 99 per cent with the contaminant being ethane and butane. Ethane content is 1 to 1½ per cent and butane content is 0.5 per cent and less.

The kettle product from the depropanizer feeds the debutanizer fractionator where the mixed butanes (normal and isobutane) are recovered as the over-head product, and 14 lb. R.v.p. natural gasoline is the bottom, or kettle, product. The natural gasoline is sent to storage through a Perco treater where a slight trace of mercaptan sulfur is removed.

The debutanizer overhead product is fed to the deisobutanizer column where the isobutane fraction is separated from the normal butane as the overhead product. The purity of the isobutane recovered is above 95 per cent. The purity of the normal butane is 99 per cent and higher.

Efficient removal of ethane from the products is accomplished by means of a high-pressure deethanizing column that removes the ethane from the rich-oil stream before the rich oil enters the still column. This column operates very similar to a stripper column. Heat is added to the reboiler producing vaporization for stripping, and the feed to the column refluxes the column and is so doing, is also stripped of its ethane. The distinct feature of this column is that butane is pumped from the debutanizer reflux accumulator into the reboiler to provide sufficient vaporization for stripping and to satisfy the equilibrium requirements of the rich oil after removal of the ethane. The butane thus used for deethanization is a continuous recycle through the system from the deethanizer to the debutanizer.

Heat required for the reboiling and preheating in the process is obtained by circulating a stream of hot lean oil through the various heat exchangers of each step in the distillation process.

Removal of water from the propane products is accomplished with fixed-bed bauxite driers.

Electrical power to operate the plant is furnished by three gas-engine-driven alternators generating three-phase current at 480 volts. Each unit is rated at 550 hp. Engines are Cooper - Bessemer high - compression, spark-ignition units. The alternators are Electric Machinery Co. units.

Cooling requirements of the plant are handled by two types of cooling equipment, designed and constructed by J. F. Pritchard & Co. The main cooling tower is an induced-draft unit which removes heat from the various process streams. The engine-cooling water system is closed and uses air-finned coolers of induced-draft design.

Water supply for the gasoline plant and houses is furnished by two water wells having a total capacity of 400 g.p.m.

Housing for supervisory personnel is located at the plant site. Eight six-room houses were built by Wagner Construction Co. of Amarillo, Tex. These houses are occupied by the five shift foremen, maintenance supervisor, assistant plant superintendent, and plant superintendent.

Streets and roadways within the plant site are paved and the plant is connected with U. S. Highway 54 by means of paved road extending from the town of Tyrone, Okla., to the plant site at the Kansas-Oklahoma line.

Officers and board of directors of Hugoton Plains Gas & Oil Co. are as follows: J. Simon Fluor, member of board and president of company; Fred R. Tuerk, chairman of board; Donald Royce, vice president; G. Hamilton Beasley, treasurer; Dewey F. Gruenhagen, secretary; and Conrad Tuerk, member of board.

Executive offices are located at 640 South Spring Street, Los Angeles.

Frank E. McMillin, executive vice president and assistant to J. Simon Fluor, has his office in Tulsa.

Field supervisory personnel members are: C. W. Thompson, general field superintendent; Leroy Esterak, geologist and assistant to Thompson; Milton Samuels, assistant treasurer; W. B. Reeves, gasoline-plant superintendent, and J. B. Baker, assistant plant superintendent.

Sulfuric Acid Regeneration

(Continued from page 135)

capacity of the plant then requires that sludge feed be cut back.

Operating Range

With present regeneration facilities, operation can be varied over a range bounded on one hand by maximum sludge regeneration and on the other, by maximum acid production.

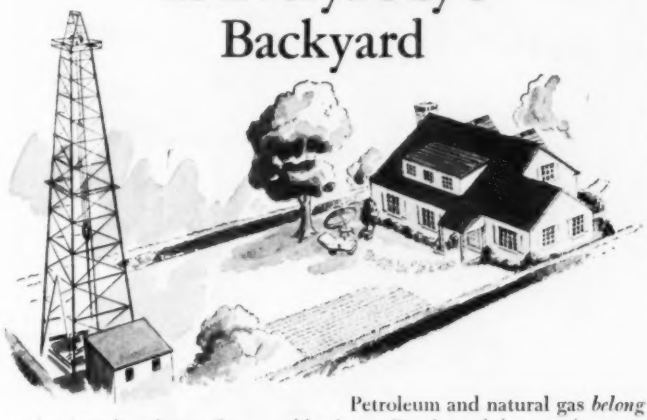
A straight conservation operation would consist of burning 320 tons per day of sludge representing all spent acid from treating and somewhat reduced alkylation operations. Furnace feed would also include the full 8 tons of sulfur available currently as hydrogen sulfide, plus about 2 tons of crude sulfur to assure proper SO_2 concentration in combustion gases. At 90 per cent plant efficiency this would produce a total of 271 tons per day of equivalent 100 per cent sulfuric acid; 245 tons from sludge, 21 tons from hydrogen sulfide, and 5 tons from purchased sulfur.

While this operation would meet ideal sulfur-recovery conditions, it would reduce the availability of 98 per cent acid for alkylation to about 236 tons per day of equivalent 100 per cent acid.

Adjustment of plant operation over the above range is governed by the relative importance of maintaining high alkylation rates vs. the advantage of conserving acid and avoiding the problems of alternate sludge disposal. In response to the urgent request by the Petroleum Administration for Defense for increasing domestic production of aviation gasoline, maximum alkylation rates are presently considered of greater importance than 100 per cent sludge recovery.

Hence the current operation at Lake Charles, outlined in Fig. 2 is for maximum acid production at the expense of ideal sulfur recovery. The plant produces 280 tons per day of 98 per cent product, all of which goes to the

In Everybody's Backyard



Petroleum and natural gas *belong* to the American home, farm, and business. Day in and day out, in many ways, they bring a better way of modern living. Along with their great significance as heat and energy sources, the progressive spirit of scientific research is showing how *versatile* are oil and natural gas in providing chemicals that are basic to new and better products, such as detergents, synthetic rubbers, man-made textile fibres, plastics, and agricultural chemicals.

Guaranty Trust Company of New York serves importantly in banking as it applies to our enterprising oil and gas industries. This bank has an experienced knowledge of the petroleum industry gained over many years through financing its development and remarkable progress.

In addition to direct financing, we act as registrar and transfer agent for oil, gas, and chemical securities, as trustee of bond issues and pension trusts, and in other capacities. Please feel welcome to consult us on your banking problems.

Guaranty Trust Company of New York

Capital Funds $378,000,000

Member Federal Deposit Insurance Corporation

140 Broadway
New York 15

Fifth Ave. at 44th St.
New York 18

Madison Ave. at 60th St.
New York 21

Rockefeller Plaza at 50th St.
New York 20

London Paris Brussels

Why does CAMERON lead the field, year after year, in

Superior Equipment

Undivided Responsibility

Reliable Field Service

alkylation operation. Roughly 25 tons of spent alkylate acid is further employed in treating blend oil, during which operation acid strength drops from 88 to 65 per cent. The 93 per cent acid production used for kerosine treating emerges as 45 tons per day of 80 per cent sludge, for a total sludge load of about 365 tons of 85 per cent strength. Of this about 313 tons can be regenerated and the remaining 52 tons must be otherwise disposed of.

Operating Experience

During the 7 years' experience on the acid plant, engineers have accumulated substantial operating know-how and are in a position to recommend design changes which would improve the plant's efficiency and capacity. Maintenance problems have increased with the addition of more contaminants in the acid sludge charged to the plant.

Recuperator deposits have presented a problem. When burning a high percentage of sulfur, operators found that sodium and calcium sulfates and slag were deposited in varying amounts on recuperator tubes. Manual removal of these solids is required. On the average, a cleanout is required after 60 to 90 days' operation. Plugging takes place first at the recuperator outlet, and a temporary expedient has been to raise the furnace temperature slightly at about 2-week intervals to melt out the deposits. The flexible tiein of the four furnaces in the dual units permits recuperator cleanout on individual furnaces while maintaining plant operations at 75 per cent of capacity.

Carborundum tubes were originally installed in the recuperators. The deposits discussed above were found to flux with the carborundum tubes and all such tubes have been replaced with chrome nickel alloy, which eliminated fluxing trouble. Engineers are now considering adoption of straight 27 per cent chrome materials in these exchangers. They are of the further opinion that a knockout pot installed ahead of the recuperator might be of help in reducing deposition in the air preheater units.

When operators began adding hydrogen sulfide to furnace feed, considerable plugging of burners resulted. This has been corrected by charging all H_2S to separate burners of a new type. Operators now meter all streams to furnaces, which are in the process of being completely instrumented.

Liquid-level controls were added to the lead-coiled scrubbers to handle makeup water added to the circulating stream which consists of 10 to 40 per cent acid. The cooling tower which employs direct water spray at two elevations was found to require well water because (1) river water temperature was not low enough, and (2) river water was brackish and contained chlorides which attacked the

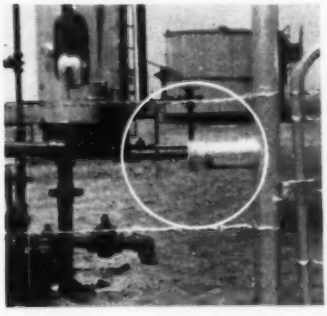
lead pumps and lines. A successful indirect system for the cooling tower would serve a good purpose in this case, since well water at the Lake Charles refinery is at a premium.

The fixed beds of vanadium catalyst proved to show longer life than originally expected. Operators discovered that a crust will form over the top of the bed, but that it can be readily broken up from time to time to maintain proper vapor flow.

Plant modifications which will permit operators to improve both sulfur conservation and acid production are now being planned. Bottleneck removal at certain points in the plant will increase capacity for sludge regeneration without adding major equipment items. Further, in cooperation with the national program for boosting sulfur recovery in refineries, more hydrogen sulfide will be diverted from the refinery fuel-gas system to the regenerative furnaces. Presently, about 40 tons per day of hydrogen sulfide is produced in the refinery, the volume varying with the percentage of sour crudes run to stills. Of that total, 20 per cent is now recovered and an additional 2½ tons will be added by diverting the straightrun depropanizer overhead stream to the Girbotol unit. Other diversions of hydrogen sulfide-hydrocarbon streams are under consideration. This program may in time eliminate the need for purchasing crude sulfur.

Nipple Holds Gager's Report

THIS 2-in. nipple welded horizontal to a gate post on Sunray Oil Corp.'s lease in Kelly pool, near Snyder, Tex., is used by tank gager to



"file" his report. Production foreman drives by and collects the report, thus saving a trip to the field office.

Nipple is fitted with a screw lid to prevent report from blowing away or getting wet.

Skid-Mounted Lease Unit

A SKID-MOUNTED lease unit, including heater, separator, and tank, is being used by engineers of New Ulm Corp. to test potentials on

the oilfield valve that's years ahead, the

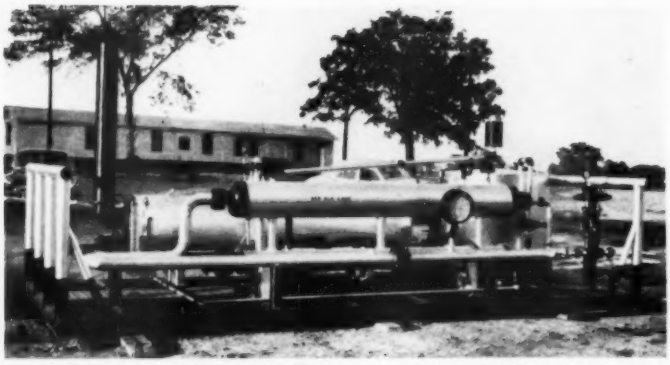
CAMERON NON-LUBRICATED LIFT-PLUG VALVE

Engineered and produced by oil-country people who understand the severe service conditions that are peculiar to oilfield operations, this valve provides a tight shut-off and easy operation without any of the headaches that go with lubricated plug valves.

Cameron IRON WORKS, Inc.

P. O. BOX 1212 • HOUSTON, TEXAS

Export: 74 Trinity Place, New York, N. Y. Represented in sterling area by: British Oilfield Equipment Co., Ltd., Duke's Court, St. James's, London S.W.1, England



new wells. The compact unit, weighing 4-5 tons including skids, is being used primarily in New Ulm field located approximately 75 miles west of Houston.

Portable test unit is moved into new locations by truck, connections are made directly to the producing well, lease gas is used to fire the heater, and the test is under way.

Since the beginning of the year, the unit has worked satisfactorily on eight wells in New Ulm field. In addition it is used for retesting on wells where high pressures are sometimes encountered and low-pressure equipment has already been installed. The portable unit may be used for tests between pressures of 10 and 1,000 psi. A test of 1,500 psi. has been run for safety factor.

Oil from the well passes through the heater where it is indirectly heated by exchange with hot water circulating in the heater. The heated oil then enters the horizontal high-pressure separator. The separator is composed of two cylindrical elements. In the upper section, a series of baffles breaks the gas out of solution. The separated liquid flows into the lower section where it leaves the separator at the oil outlet. A large surface area is exposed in the lower chamber to allow entrained gas to escape from the oil.

Upon leaving the separator dry gas is metered and then passed out of the system through a back-pressure valve.

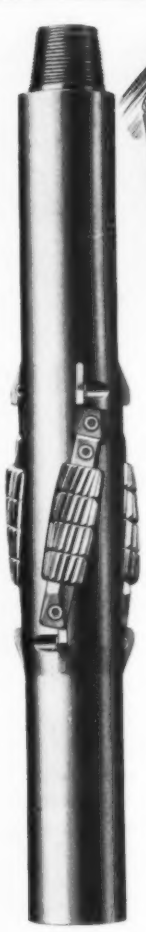
Separated liquid meanwhile is dumped into the small storage tank mounted verticaly on the platform. Two gage glasses are mounted on the previously calibrated tank to measure liquid recovery.

A thermosiphon effect is used between the storage tank and heater to provide a continuous flow of hot water through coils mounted within the tank. This is done to lower the high viscosity of the oil for testing.

Production in New Ulm field is both gas distillate and oil out of the Wilcox sand. Heaters have been found necessary in the tank to bring oil up to its pour point of 86° F. to permit accurate gaging.

Hot water runs through a pipe connecting the top of the heater to coils in the storage tank. The water circulates through the coils, exchanging its heat with the oil, cold water passes from the bottom of the tank coil into the bottom of the heater.

The portable unit was designed by Johnnie White, general superintendent for New Ulm, and fabricated by Union Tank & Supply Co., Houston, using standard equipment. Heater was the 500,000 B.t.u. model 50-110-2, separator was 14 in. by 10 ft. 1,000 lb. horizontal model, and the tank was 4½ ft. in diameter by 4 ft. high. A slight modification was made in lowering the heater stack to allow for clearance when transporting unit under bridges.



GRANT REAMER CUTTERS are angled to the right. Therefore, the Reamer will not thread itself into tight hole, and assures desirable shearing-cutting action as well as round, full-gauge hole.

Now—you get *longer wearing life than ever before* with the Grant Reamer since all parts subject to wear are component parts of the cutter assemblies. Thus, simply changing cutter assemblies renews the entire tool. *No welding is required in the manufacture or maintenance of the Reamer body, eliminating the need for shop repairs.*

Proven Grant Tools—Used Where Performance Counts

Hydrostatic Bailers	Bulletin No. 11
Liner Pullers	Bulletin No. 14
Pressure Releases	Bulletin No. 15
Hydraulic Expansion Casing Scrapers	Bulletin No. 17
Rotary Underreamers	Bulletin No. 24
Cable Tool Underreamers	Bulletin No. 27
Hole Enlargers	Bulletin No. 38
Reamers	Bulletin No. 43-A
Hydrostatic Perforation Cleaners	Bulletin No. 50
Dump Bailers	Bulletin No. 51
Roller Cutter Shale Bits	Bulletin No. 54
Sand Pumps	Bulletin No. 55
Well Cleanout Procedures	Bulletin No. 57
Wall and Bottom Hole Scrapers	Bulletin No. 58
Vertical Casing Scrapers	Bulletin No. 59

Write for Descriptive Bulletins on these Grant Tools

GRANT OIL TOOL COMPANY

Main Office and Plant
2042 E. Vernon, Los Angeles 58, Calif.
Branches Throughout California and The Mid-Continent

Subsidiary: MacClatchie Manufacturing Company

CORROSION and its control

Corrosion Testing for Refinery Components

THE corrosive conditions in any kind of a process plant—of which category petroleum refineries represent not one, but many types—are in one sense much more complex than those on a buried pipe line, while in another they are much simpler. They are more complex in that they include exposures of a wide variety of metals and alloys to a wide variety of corrosive fluids, at a considerable range of temperatures, pressures, and velocities. They are simpler in that the specific conditions at a certain point in the plant are generally better known, or at least capable of being better known, than those along a pipe line.

Not only are the conditions better known, but they are more subject to control. Although it would be ideal from the point of view of the process engineer to be able to design the plant and specify the process with no thought of corrosion, it is well recognized that this cannot be done, and very often indeed modifications in processes are introduced in order to control corrosion.

In at least one other way the problems of refinery equipment corrosion are more amenable to attack than those of the buried structure. The economic value per square foot of refinery equipment is much higher than that of pipe lines; hence it is possible to spend much larger sums for protection. This, of course, makes several techniques available which are denied to those whose principal concern is pipe lines. Among these may be mentioned the use of special alloys or even metals more costly than steel; surface treatments or coatings, such as Hastelloy, Colmonoy, and other surfacing materials applied by welding; clad metals where useful; and environmental control, by the use of inhibitors or by direct modification of the process.

In order to select and apply corrective measures, it is necessary to know where corrosion is a problem, and with what degree of severity it is progressing. Four general methods of obtaining information as to corrosion severity are available; each has certain advantages and disadvantages. These four methods may be described as follows:

1. Direct measurement and observation of corrosive attack on operating equipment.—This is, naturally, the most positive and unequivocal method possible. It is also the slowest and, in the event of really serious corrosion, the most expensive as well as the most hazardous. It is the method which is automatically in operation in any plant which has no formal corrosion program, and is the method which is applied when a new and unsuspected corrosion problem is first discovered, during the course of a routine inspection or in the investigation following a failure.

Direct observation is, nevertheless, an extremely useful technique; it should be employed on every component concerning which there is the slightest possibility of corrosion, at every convenient opportunity. Where any evidence of corrosion, even slight, is observed, it should be recorded in quantitative terms for future use; only by the careful recording of actual measurements can this method of study prove useful and effective.

2. Tests of specimens inserted in process streams.—In order to evaluate different possible metals and alloys as to their relative resistance to specific corrosion conditions, specimens may be inserted in process equipment. The size, shape, and arrangement of these specimens are of extreme importance if the results are to be of value. In order that comparable results may be obtained, certain standards have been set up for such tests. These will be described in a later article in the series.

The advantages of the test specimen method are obvious; several different materials may be tested simultaneously; the cost is much lower than that involved in actually installing equipment of the various alloys to be tested; by careful weighing, corrosion rates may be measured with precision over a relatively short period of time; and laboratory analysis of the specimens or of the corrosion products may lead to a better understanding of the actual process involved. The disadvantages are not quite so obvious, but are very real; there is no assurance that the behavior of a small sample is entirely typical of the behavior of large surfaces of the same material; it is impossible to be certain that the exposure of the sample is a fair sample of the vessel exposure; and, in some cases, the very presence of one or more of the specimens may interfere with or affect the normal behavior of some of the others.

At its best, the use of specimens is indicative; it may quickly eliminate some materials from consideration, and thus narrow the field of exploration necessary. At its worst, it may be very misleading. Careful control can usually avoid extremely misleading results.

3. Laboratory test.—An effort may be made to duplicate in the laboratory the conditions existing in some part of the plant, or even in a planned plant. Specimens of various materials may then be subjected to the artificialy created environment, and from the results, the behavior of the same materials under plant conditions predicted. In the laboratory, it may even be possible to conduct accelerated tests, which show in a short interval of time, the results to be expected in longer periods in actual service.

The advantages of this technique are similar to those of the last discussed, plus the advantage of being able to study conditions in parts of a system which exist only in plan. Any number of materials may be studied at relatively low cost, and without introducing any interference into the normal operation of the plant. The disadvantages are likewise similar; it is never entirely safe to predict service behavior solely on the basis of laboratory tests, accelerated or normal rate. True and complete plant conditions cannot be duplicated anywhere but in the plant. Yet it is clear that much preliminary work can be done in this way, and a great deal can be learned.

4. Study in situ.—The first method described was that of observing the effects of actual process corrosion; the one now under consideration deals with observing the process of corrosion. By this is meant the measurement of associated quantities; in the case of galvanic corrosion, currents and voltages may be studied; in any kind, there may be measurements of the change in iron content of the process fluids, for example, to detect metal being removed by corrosion. Or again, the corrosion process may alter the pH of the fluid, or some other measurable characteristic.

Part 36 of a series by Marshall E. Parker, consulting engineer, Houston.

Any ONE of these Reasons

is reason enough to always specify

American Iron *Straight Grip* TOOL JOINTS

Straight Grip TOOL JOINTS
— are 3 times as strong as the pipe they connect!

Straight Grip TOOL JOINTS
— give positive protection against joint leakage and creep!

Straight Grip TOOL JOINTS
— tighten their seal as the tension load and pump pressure increase!

Straight Grip TOOL JOINTS
— are precision machined and heat-treated to exacting specifications!

Straight Grip TOOL JOINTS
— are quickly and easily installed or removed at the drilling rig!

Straight Grip TOOL JOINTS
— require *no selective fitting* to the drill pipe!

Straight Grip TOOL JOINTS
— are designed right . . . made right . . . installed right . . . TRIED AND PROVEN!

AMERICAN IRON & MACHINE WORKS CO.
MANUFACTURERS OF A OIL FIELD EQUIPMENT
REG. U.S. PAT. OFF.
OKLAHOMA CITY U.S.A.

4 POINT SEAL PROTECTION

The basic design of Straight Grip TOOL JOINTS provides the following 4 points of seal:

1. STABILIZER FLUID SEAL
2. THREAD TENSION SEAL
3. INSIDE FLUID SEAL
4. SHOULDER FLUID SEAL

Also manufacturers of A.P.I. "Amweld" (counterbore weld) and "Flash Welded" Tool Joints.

American Iron & Machine Works Co.

OKLAHOMA CITY, OKLAHOMA • BOX 1177 • PHONE L. D. 518

DISTRICT OFFICE: HOUSTON, TEXAS

EXPORT OFFICE: 11 WEST 42ND ST., NEW YORK CITY, N. Y.

QUESTIONS on TECHNOLOGY

by W. L. Nelson
Consulting Engineer

Most Important Refinery Processes

What are the main processes that are conducted in a refinery? Which are the most important?—T. F. B.

From a standpoint of capacity, the majority processes obviously are topping, thermal cracking, and catalytic cracking. Almost invariably, the recovery of olefinic gases by polymerization or alkylation is conducted along with the cracking operations, and these gas-recovery processes are significant not because of capacity, but because of universal economic feasibility.

An analysis of the refining capacity of the United States for the year 1950 or 1951, *(The Oil and Gas Journal, March 29, 1951, page 329)* shows the following approximate capacities:

	B.P.D. feed
Topping	7,032,300
Thermal cracking	2,334,600
Catalytic cracking	1,887,500
Gas recovery	*196,100

*Products, not feed.

TABLE 1—TYPES OF THERMAL CRACKING OPERATIONS (APPROX.)*

	Per cent
Reforming	10.5
Coking	3.5
Crude oil feed (no topping)	1.4
Viscosity breaking:	
Separate operation	8.4
Heavy-oil coil	†42.0
Gas oil (by difference)	34.2
Total thermal	*100.0

*Not including gas or hydrocarbon cracking. †An estimate.

TABLE 2—TYPES OF CATALYTIC OPERATIONS (APPROX)

	Per cent
Fluid	61.3
Thermofor	17.8
Houdry and Houdriflow	*17.7
Platforming	†1.0
Others	2.2

*Houdriflow 3.4 per cent, a relative new process. †A new rapidly growing reforming process.

Feed stocks	Per cent
Crude	100
Topped crude, gas oil, crude	33.2
Gas oil	26.8
———	4.6

The thermal cracking operations involve all such operations, including reforming, coking, viscosity breaking, and the feeding of crude oil directly to the cracking unit. Catalytic cracking includes all of the conventional catalytic processes as well as reforming operations, Hydroforming, and Platforming. Polymerization, alkylation, isomerization, gas reversion, and polyforming are included among the gas-recovery operations. Thus, 60 or more per cent of the plant capacity is represented by cracking operations with thermal cracking about 55 per cent of the total cracking capacity. It is expected that the total cracking capacity of the future will consist of about half thermal and half catalytic capacity, and eventually the catalytic capacity may constitute 60 per cent of the total cracking capacity *(this page, Future of Thermal and Catalytic Cracking, The Oil and Gas Journal, October 19, 1950, page 125)*. This conclusion is based upon consideration of the necessity of disposing of heavy residual stocks that will continue to be a part of our crude oils and upon the present difficulty in disposing of catalytic cycle stock. If the thermal cracking of cycle stock could be totally avoided, the catalytic capacity would occupy even a more important position than that indicated above.

An analysis of the kinds of thermal cracking is not entirely satisfactory because the amounts of reforming, coking, etc., are not always stated, and the classification of a process as viscosity breaking means little because most viscosity breaking is conducted in a black recirculation heavy-oil coil and is not called viscosity breaking. Thus, viscosity breaking (considered as black-oil cracking) is probably practiced on 50 per cent of the total thermal cracking feed stocks even though publications indicate only 8-10 per cent of viscosity breaking. Tables 1 and 2 indicate the various cracking processes listed by The Oil and Gas Journal.

About 60 per cent of the crude capacity is processed by cracking, leaving only 40 per cent to be accounted for by lubricating-oil or asphalt-manufacturing operations. Much of the 40 per cent is represented by straightrun (unreformed) gasoline, kerosine, diesel fuel, and asphalt indicating that only 15-20 per cent of our crude-oil capacity is processed for lubricating oils. Of the United States capacity, 51 per cent of the plants indicate that they process part or all of their crude oil from lubricating oils, and even 58.5 per cent report the manufacture of asphalt. Thus, a composite or average United States refinery would produce (based on total lube and asphalt production of the United States) about 4.5 per cent of lubricating oil and about 4.3 per cent of asphalt. Complete refineries process about 45.0 per cent of the total United States crude capacity.

The amount of polymer and alkylate gasoline that can be produced in existing poly and alkylate plants represents the following percentages of combined cracking capacity (thermal and catalytic):

	Per cent
Alkylate	2.5
Polymer	1.5

The yields of these materials (particularly alkylate) are somewhat larger than these average figures, for catalytic cracking operations, and of course smaller for thermal cracking plants.

Yields.—Another method of evaluating refinery processing operations are the yields of products that are produced or that are required to meet trade demands. Table 3 indicates significant average operations and trade demands.

All of the foregoing is based purely on a study of the capacities handled or the products required in the petroleum industry. However, it does not follow that the many special processes such as those for producing lubricating oils, asphalts, insecticides, liquefied gases, butadiene for rubber, ethylene for alcohol or plastics, etc., are unimportant. These specialty processes are also vital, and the fact that the crude oil required to supply much material is not large, simply means that smaller plants are employed or only a few major producers can operate.

TABLE 3—APPROXIMATE REFINERY YIELDS AND TRADE DEMANDS (1949-1950)

	Average U. S. refinery production‡	U. S. complete refinery*	U. S. demand‡	World demand§ excl. Russia
Motor fuel	43.5	38.0	45.0	26.7
Kerosine	5.2	4.6	5.0	6.6
Distillate fuel	17.5	17.1	16.3	18.5
Residual fuel	21.9	17.3	24.5	40.1
Lube oils	2.3	4.5	1.6	†1.7
Wax	0.2	0.4	0.1	†0.1
Coke	0.9	1.1	0.8	
Asphalt	2.5	4.3	2.4	†3.3
Other products	5.9	12.5	4.3	†3.0
Shortage	0.1	0.2	...	...

*Estimate based on the assumption that substantially all lubricating oils, specialties and asphalt is produced in large complete refineries. †Estimate. ‡Twentieth Century Petroleum Statistics 1950, DeGolyer & MacNaughton. §Nelson, W. L., The Oil and Gas Journal, December 21, 1950, and other private sources.

The new $2,000,000 lubricating-oil and grease-manufacturing plant of Canadian Oil Companies, Ltd., at Montreal. Canning line is geared to fill 18,000 quart containers of motor oil per hour.

Canadian Oil's New Lubes Plant

Project at Montreal is first of its type to be installed in Canada

THE lubricating-oils plant of Canadian Oil Companies, Ltd., opened less than a month ago in Montreal, is the first of its type installed in Canada. It is one of the projects included in Canadian Oil's $22,000,000 expansion program and is geared to produce various grades of lubricating oils and greases.

Built on a 13-acre site on the St. Lawrence River, the Montreal plant is a five-way operation, with a canning line, a steel-barrel reconditioning plant, and a pilot plant incorporated into a three-story brick structure housing the separate oil and grease departments.

The modern plant includes Canada's first oil homogenizer, which is used for blending ingredients of automotive, aircraft, or industrial oils into uniform texture. The building also holds the country's first grease colloid mill. The oil canning line is Canada's speediest and can fill and package 18,000 qt. of motor oil alone in an hour.

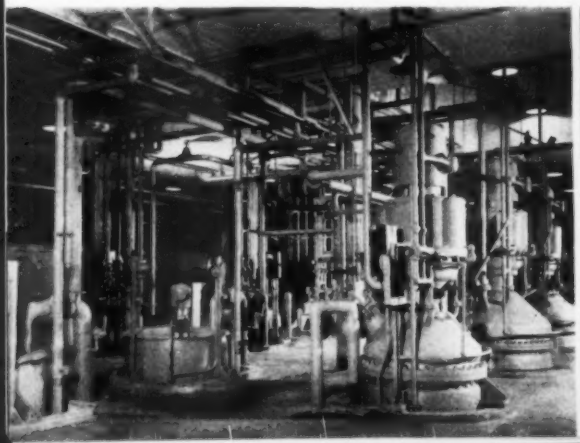
The plant's pilot unit is a miniature of the plant's grease-manufacturing setup. This facility enables manufacturing methods for different greases to be worked out from laboratory formulas before full-scale manufacturing begins.

Canada's acute steel shortage, caused by the stepped-up defense program, prompted installation of a complete container-conditioning plant where oil drums are overhauled for extended use.

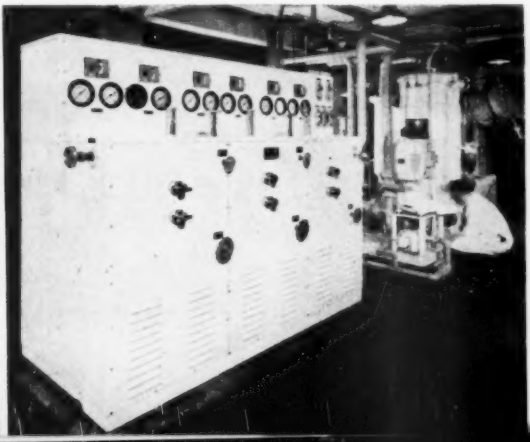
This section of the new plant includes a new type of rotary dedenter along with another machine which strips and buffs off the old paint and washes and rinses the outsides of the barrels. Other units wash, rinse, and vacuum dry the drum interiors. Between the exterior and inside baths, the drums pass through another unit where a cleaning solution and several lengths of special chain with sharp-edged links are placed in each drum. The drum is then rotated violently, the chains lashing its entire inside surface remove any foreign material which may be present.

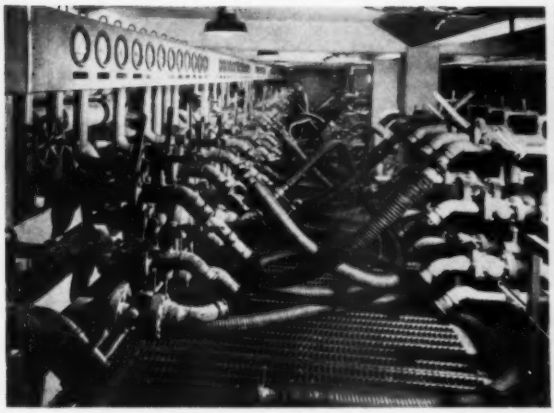
In the leak-testing operation, air

Grease mixers seen from operating floor. The electrically powered mixing equipment is positioned to provide ample working room for operating personnel. Connecting piping is arranged for convenience and efficiency.

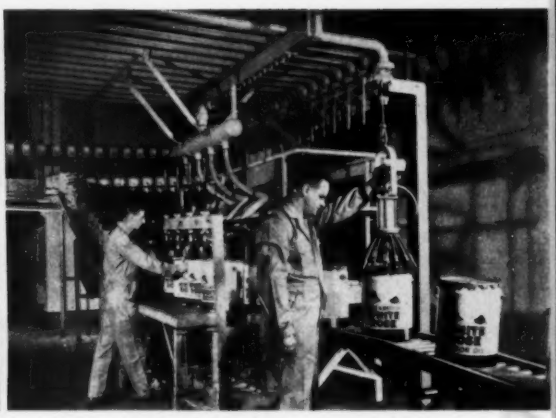


Canada's first homogenizer for a lubricating-oil plant is shown here along with a proportioning unit. Stocks fed to the proportioner are supplied in proper ratio to the homogenizer for final mixing of a given blend.





Base stocks from storage tanks are supplied the various operations via this manifold. Each outgoing line is connected with a flow indicator. Any desired combination of tank-to-process connection may be obtained.



The new plant's lubricating-oil filling line for 5-gal. containers. Here the cans are being filled and sealed. Similar operations are carried out for other size containers.

is applied and the drum is rotated in water. Strong light shining up through the water bath reveals minute leaks. "Leakers" are diverted to the drum welder for repair.

The drums pass to spray-painting booths and a paint-drying, cooling, and stenciling department, thence to filling machines. The paint dryer is equipped with infrared lamps which supply heat to dry the freshly painted drums as they move on conveyors.

The specialty canning line is a typical cross-section of the plant's highly mechanized layout. At the start of the line, cartons containing cans from storage are lifted from conveyor to an unscrambler, which shunts the cans to high-speed fillers. A conveyor then carries them to an automatic closer. The cans continue via conveyor and elevator to the packers, thence onto another conveyor to an automatic unit, where the cartons are sealed and stamped with the correct S.A.E. number. Conveyors also deliver the cartons to storage, ready for shipment as needed.

Five-gallon containers pass through a different type of filling operation. Overhead conveyors move the pails to a high-speed multiple filler, then by similar stages to end-of-the-line trucks, which move them to storage.

Proportioning Unit

A proportioning unit accurately measures base materials which go to make up the various motor oils and industrial lubricants. These exactly proportioned ingredients pass to a heater, then through a filter and to the homogenizer. This process is carried out under vacuum, so that every trace of air and moisture is removed. From the homogenizer the oil passes to a cooler, and along to storage. This application of modern blending and compounding techniques assures that all ingredients stay "put" in solution, with detergents and inhibitors of oxidation and corrosion effectively dispersed.

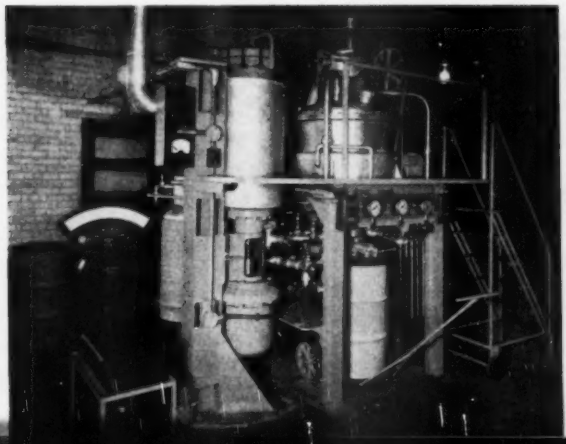
Grease making requires precision methods and technical control to produce the many types of lubricants demanded. The equipment used in the new plant at Montreal for manufacture of these products is highly specialized.

One of the problems of the industry has been to produce a grease which retains consistency in service. Canada's first grease colloid mill eliminates this in-use problem for Canadian Oil Companies, Ltd. The colloid mill "preworks" and breaks in the grease so that it is fully conditioned and tempered for the job for which it has been designed.

After compounding and mixing, and before being placed in containers, the greases are pumped at high speed through close-set spinning disks in the mill, which also has a device to free the grease of trapped air bubbles, which detract from performance. In containers ranging from 5-lb. pails to 400-lb. drums the grease is lift-trucked to storage or shipping departments.

The entire new plant at Montreal was engineered, designed, and constructed by Fluor Corp.

Manufacturing techniques are worked out in this pilot plant before operations are attempted in the full-scale plant. This method insures quality of product. The pilot plant's flexibility covers a wide range of lubricants.



A section of the up-to-the-minute laboratory in Canadian Oil's new lubricating-oil and grease-manufacturing plant at Montreal. Here control of production is carried out.

Application of Houdriforming to production of aromatics and high-octane motor gasoline

by H. Heinemann,* J. W. Schall,* and D. H. Stevenson*

High yields of benzene, toluene, or xylenes are possible from the Houdriforming of close-cut naphtha fractions. Conversions of naphthenes to aromatics of up to 95 per cent of equilibrium are obtained along with large quantities of 98 volume per cent purity hydrogen. Low-octane straightrun naphthas can be processed to high yields of high-octane motor gasoline. Data presented for a few feed stocks show yields of debutanized motor gasoline up to 86.6 volume per cent of charge when processing to the 90 F-1 clear octane level.

THERMAL and catalytic reforming of straightrun naphthas have been subject to many developments in the course of the last 20 years. Thermal reforming adequately met the relatively low-octane requirements prevailing in the past. However, as octane requirements have increased, thermal reforming has suffered largely from volume losses of liquid hydrocarbons to gaseous hydrocarbons. Catalytic reforming has been practiced mostly in the form of fixed-bed hydroforming, a process which involves operation at elevated pressure and with cyclic regeneration, requiring constant pressuring and depressuring of reaction vessels.

Only recently have reforming processes been developed which permit the production of high-octane-number gasolines at high yields in a continuous operation requiring no regeneration or infrequent regeneration if operated at very severe conditions. Houdriforming is a continuous catalytic reforming process.

The reactions occurring in the Houdriforming of a naphtha charge are selective and consist predominantly of dehydrogenation, isomerization, aromatization, hydrocracking, and desulfurization. Dehydrogenation and dehydroisomerization of naphthenes permit the production of aromatic concentrates such as benzene, toluene, and xylenes from naphthene-rich naphtha fractions. The same reactions plus isomerization of paraffins and aromatization of paraffins result in high yields of high-octane motor gasoline from straightrun naphtha fractions. In the production of both aromatics and high-octane motor gasoline, hydrogen is produced with good purity as a byproduct of the process. The process is continuous at normal operating severity but, at conditions of extreme severity, periodic regeneration of the catalyst to remove coke may be necessary.

Several pilot units have been operating for the last 2 years at the Houdry laboratories to obtain data on Houdriforming various charge stocks. Fundamental process data on pure compounds are obtained from isothermal reactor units. Actual processing data on typical naphthas are obtained with multiple reactor units in which the reaction is allowed to proceed adiabatically in each reactor to simulate proposed commercial operation. The number of reactors operated in series can be varied to give the desired results when processing different charge stocks.

Since the major reaction is endothermic, interstage reheaters are provided between reactors to reheat the reactor effluent and thus supply the endothermic heat of reaction. Recycle hydrogen is separated from the liquid product in a simple gas-separation tank at run pressure and room temperature and is compressed and charged along with the hydrocarbon feed. The hydrogen content of this stream varies from 86 to 98, depending on the charge stock and operating conditions used. The quantity of recycle hydrogen is regulated so that a sufficient partial pressure of hydrogen is maintained to prevent or minimize coke deposition on the catalyst.

Processing Pure Compounds

The primary reactions occurring in Houdriforming and contributing to the upgrading of the charge stock are the dehydrogenation of C_6 ring naphthenes, the dehydroisomerization of alkyl cyclopentanes and the conversion of paraffins by isomerization, hydrocracking, and aromatization. In normal operation it is obviously impossible to follow completely each one of these reactions because of the complexity of the feed stock and the interaction of hydrocarbons in the feed stock.

In experimental units it is possible to charge pure compounds and to analyze reaction products for the individual compounds formed. In this way, it is possible to follow the transformation of hydrocarbon classes within certain limitations. The conclusions resulting from such pure compound work, of course, are not entirely applicable to mixed feed stocks. In the latter case there is competition between the various types of hydrocarbons for the active sites of the catalyst.

Due to preferential adsorption of certain types of hydrocarbons on the active sites, these sites may be denied to other types of hydrocarbons with a resulting suppression or reduction in the rate of specific reactions. Even so, it is interesting to note the extent to which pure hydrocarbons react. The processing of pure hydrocarbons offers a good means of testing catalyst activity for specific reactions.

Table 1 shows the conversion of cyclohexane to benzene over a typical Houdriforming catalyst at 300 psig. pressure, a hydrogen-to-oil molar ratio of 4, and three different severities obtained by changing temperature and space rate. Comparison with equilibrium conversion under the same conditions shows that equilibrium was essentially reached at each level of severity.

Methylcyclopentane is the most difficult of the alkyl cyclopentanes to dehydroisomerize. Its conversion to benzene therefore constitutes a severe test for catalyst activity. If one dis-

TABLE 1—HOUDRIFORMING OF CYCLOHEXANE
300 psi.; H_2:Oil = 4 Moles

Severity	Cyclohexane → Benzene conversion, per cent	
	Found	Equilibrium value
1	50	55
2	70	74
3	92	94

*Houdry Laboratories, Houdry Process Corp., Marcus Hook, Pa. Presented at A.I.Ch.E. meeting, Galveston, October 1951.

regards side reactions such as cracking or ring splitting, methylcyclopentane will be converted to benzene in yields corresponding to 80-90 per cent of the calculated thermodynamic equilibrium yields. Due to the uncertainty in the calculation of equilibrium values, the reaction must be considered as proceeding essentially to equilibrium. This dehydroisomerization is relatively slow and yields approach equilibrium as space rate declines. The amount of cracking occurring is, of course, influenced by operating conditions and also by the amount and nature of other compounds present.

Normal heptane can be chosen as a typical paraffin stock for Houdriforming operation. Wide variations in product distribution can be obtained by changing catalyst composition and operating conditions. At mild operating conditions, approximately 9 per cent aromatics, mostly toluene, are obtained from normal heptane. The molar ratio of iso to normal paraffins in the C_7 fraction of the product is approximately 1.5. At more severe conditions the aromatics content will increase to about 15-16 per cent and the iso to normal ratio of C_7 fraction will increase until hydrocracking of the isoparaffins formed becomes the predominant reaction. The most favorable operating conditions must therefore be selected on the basis of products desired (aromatics or isoparaffins).

Aromatics Production

The petroleum industry is currently faced with the problem of alleviating the critical shortage of benzene, toluene, and xylenes needed for the defense effort and for the expanding chemical and plastics industries. The reactions promoted by a Houdriforming catalyst can be applied to closely cut naphtha fractions for the production of these specific aromatics. The charge stock to such an operation may include a combination of benzene, toluene, and xylene formers, or it may be so fractionated as to include formers for only one of these aromatics. The choice of naphthenes to include in a charge stock will depend, in part, on the type of charge stock, the desired yield of specific aromatics, and the separation scheme to be used.

Best yields of aromatics will be ob-

TABLE 2—HOUDRIFORMING A C_7 FRACTION FOR BENZENE PRODUCTION

Debutanized liquid, vol. % chg.	87.9
C_1's, vol. %	2.6
Propane, wt. %	0.9
Ethane, wt. %	0.6
Methane, wt. %	0.4
Hydrogen, wt. %	3.4

Analysis: vol. %	Charge	Debutanized liquid
Benzene	2.7	51.2
Toluene		3.9
Methylcyclopentane	36.7	13.0
Cyclohexane	27.4	1.1
Heavier naphthenes		0.8
Olefins		1.8
Paraffins	13.2	28.2

best anywhere

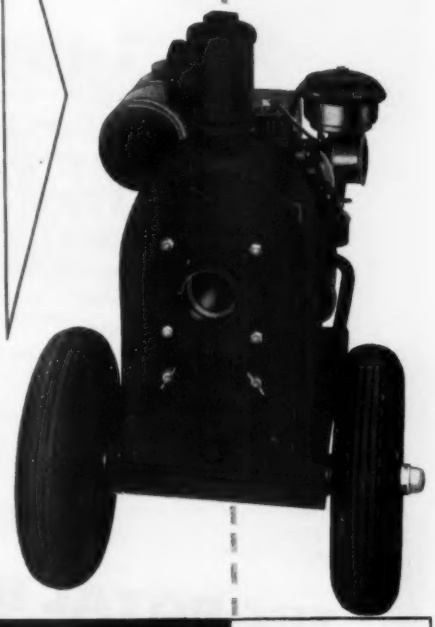
McGOWAN

self-priming centrifugal pumps for oil field jobs

Here is the outstanding pump in its field. It is designed, engineered and constructed with McGOWAN "know-how". Now in operation in oil fields all over the world. All welded steel design for greater strength and lighter weight.

Features include automatic priming, non-clogging impeller, hardened wear plates, large access plates, tested and trouble-free shaft seals.

See your Supply Co. or call direct. FREE CATALOG on request to: Dept. C, McGowan Pump Division, Leyman Mfg. Corp., Central Ave., Cincinnati, Ohio.



SINCE 1852 McGOWAN PUMPS

McGOWAN PUMP CO.
CINCINNATI, OHIO

division of
LEYMAN MANUFACTURING CORPORATION

TABLE 3—HOUDRIFORMING A C_6-C_7 FRACTION FOR BENZENE AND TOLUENE PRODUCTION

Debutanized liquid, vol. % chg.	89.3
C_4's, vol. %	2.6
Propane, wt. %	1.1
Ethane, wt. %	0.3
Methane, wt. %	0.2
Hydrogen, wt. %	2.7

Analysis: vol. %	Charge	Debutanized liquid
Benzene	1.4	15.6
Toluene	4.6	31.7
Methylcyclopentane	4.6	2.8
Cyclohexane	13.9	0.8
Dimethylcyclopentanes	9.6	3.0
Methylcyclohexane	23.1	0.3
Olefins	-	0.9
Paraffins	42.8	43.1

TABLE 4—HOUDRIFORMING C_6 FRACTIONS FOR AROMATICS PRODUCTION

C_5+ liquid vol. % chg.		91.1	87.1
C_4's, vol. %		1.8	3.6
Propane, wt. %		0.9	1.3
Ethane, wt. %		0.4	0.8
Methane, wt. %		0.2	0.8
Hydrogen, wt. %		2.1	2.2
Analysis: vol. %	Charge	C_5+ liquid	Charge C_7+ liquid
Toluene		5.4	2.5
C_7 Aromatics	1.9	30.3	8.0 40.9
C_8 Aromatics	1.1	5.1	18.4
Naphthenes	42	2.0	61 2.0
Olefins		2.0	2.0
Paraffins	55	55.2	31 34.2
F-1 octane No. (total C_5+ liquid)			94.3
F-4 + 4.6 cc. TEL aviation blending P. N. (aromatic portion)		190	220

tained by running closely cut fractions resulting principally in the formation of only one of the aromatics. However, economic considerations will in certain cases favor an operation in which a blend of aromatic formers is charged.

The results of processing a closely fractionated naphtha containing only C_6 hydrocarbons are presented in Table 2. This stock, because of its high content of methylcyclopentane (56.7 volume per cent), presents a rigid test material for an aromatics producing catalyst. In a once-through operation, a debutanized product containing 51.2 volume per cent benzene and 3.9 volume per cent toluene was obtained. Higher conversion of the naphthenes is possible by increasing the severity of operation, however, the conversion efficiency (defined as, naphthenes converted to aromatics divided by naphthene disappearance) is markedly reduced. The most efficient conversion of naphthenes would be obtained with a recycle operation at sufficiently mild conditions to keep side reactions negligible.

Another typical naphtha, fractionated to contain only benzene and toluene formers, was processed and the results are presented in Table 3. In a once-through operation, a debutanized product containing 15.6 volume per cent benzene and 31.7 volume per cent toluene was obtained. This yield of aromatics represents approximately 90 per cent total conversion of naphthenes to aromatics. This high conversion of naphthenes was accomplished with very little loss due to side reactions. Approximately 1,300 standard cubic feet per barrel of 98 volume per cent hydrogen is produced as run gas from this charge stock. Since no CO or CO_2 is present in this hydrogen, it is a more useful product for most purposes than hydrogen of similar or higher purity obtained in a hydrogen plant using a water-gas shift reaction.

Houdriforming is also applicable to the production of C_8 aromatics for use as chemicals or in aviation-gasoline blending stocks. Table 4 presents data obtained from processing two different fractions containing predominantly C_7 hydrocarbons. The first stock contained 42 volume per cent naphthenes and yielded a product containing a total of 40.8 volume per cent aromatics. The aromatics when separated from the liquid product had an aviation blending per-

ASK THE ROYAL ABOUT CANADA'S OIL

Branches throughout Canada's oil-rich western plains. On-the-spot information available through J. C. Mayne, Supervisor, Calgary, Alberta, or Head Office, Montreal

Assets exceed $2,497,000,000

We do not provide information on oil securities

THE ROYAL BANK OF CANADA

Over 750 branches in Canada and abroad

formance number of 190 (F-4 + 4.6 cc. TEL).

The second charge stock shown in Table 4 contained considerably more naphthenes (61 volume per cent) and yielded a product containing 61.8 volume per cent aromatics. The aromatics from this product had an aviation blending performance number of 220 (F-4 + 4.6 cc. TEL). In both cases very little hydrocracking occurred as evidenced by the low yields of butanes and lighter hydrocarbons.

Motor Gasoline Production

High yields of high-octane motor gasoline are obtainable from straight-run naphthas. Fig. 1 presents the Reid vapor pressure, octane number, and yield of C_5+ motor gasoline obtained when processing an East Texas type naphtha. The data presented were obtained by varying space rate and temperature at a constant pressure and recycle gas to oil mole ratio. A 93 F-1 clear octane gasoline with a Reid vapor pressure of 7.2 psi. was obtained at a yield of 89.7 volume per cent. Under all of the conditions used to obtain the data in Fig. 1, outside butanes are required for 10-lb. R.v.p. gasoline.

More detailed data for an East Texas type naphtha and two other naphthas are presented in Table 5. Inspections of the charge stock, and yields and inspections of the C_5+ product are presented. At the 90 F-1 clear octane level, the yields of C_5+ product for the three stocks range from 84.3 to 86.6 volume per cent, with yields of butanes ranging from 5.2 to 7.2 volume per cent. In all cases there is an increase in A.S.T.M. distillation end point of the product over that of the charge. However, this increase is to be expected when converting naphthenes to the corresponding aromatics.

The yield of C_5+ product vs. F-1 clear octane number for each of the three stocks is presented in Fig. 2. Although starting at different octane levels, each of the stocks yields approximately the same volume per cent gasoline at the 90 F-1 clear octane level. The curves in Fig. 2 show no sharp decrease in yield for a given octane improvement. It must be expected that a sharp break in the curve will occur at some point because of excessive hydrocracking. However, excessive hydrocracking was not encountered at any condition of severity used in processing these charge stocks.

The hydrogen content of the run gas and recycle gas for these operations varied between 86 and 96 volume per cent depending upon the severity of operation. It is of interest to mention that the data presented for motor gasoline production were obtained with catalysts having previous continuous operating histories of from 800 to 1,400 hours and therefore represent performance of well aged catalyst.

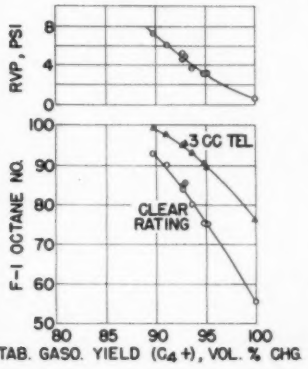


Fig. 1—Octane number and Reid vapor pressure of stabilized gasoline as functions of yield.

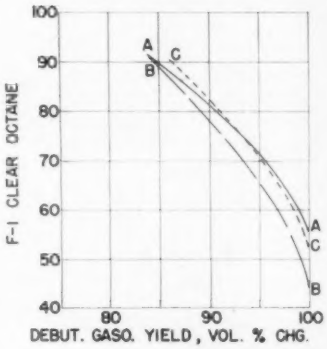


Fig. 2—Yield-octane relationship for Houdriforming various naphthas.

TABLE 5—HOUDRIFORMING NAPHTHAS FOR MOTOR GASOLINE PRODUCTION

Charge stock—	A		B		C	
C_5+ liquid, vol. % chg.	85.8		84.3		86.6	
C_4 cut, vol. %	5.2		7.2		6.1	
Propane, wt. %	2.9		4.0		3.0	
Ethane, wt. %	1.7		1.8		1.8	
Methane, wt. %	0.9		1.0		0.7	
Hydrogen, wt. %	1.3		0.8		0.6	
Inspections of C_5+ liquid—	Charge stock		Charge stock		Charge stock	
Gravity, °A.P.I.	55.3	48.2	52.7	44.1	51.6	47.1
Distillation, A.S.T.M., °F.:						
I.B.P.	188	148	238	152	220	138
10 per cent	215	200	266	224	247	208
50 per cent	252	254	300	286	286	274
90 per cent	317	326	358	354	354	358
End point	368	385	396	438	396	438
Octane numbers:						
F-1 clear	55.6	89.1	42.5	90.3	51.5	90.2
F-1 + 3 cc. TEL/gal.	76.3	97.1	65.8	97.4	68.8	97.4
Reid vapor pressure, psi.	0.7	2.4	0.7	2.7	....	3.0
Chemical composition:						
Paraffins	44	41	44	40	34	38
Olefins	0	1	1	2	0	2
Naphthenes	42	3	43	1	52	5
Aromatics	14	55	12	57	14	55

Porosity Index in Limestone

(Continued from page 142)

$$p = (R_m/2R_i)^{1/2} = 0.7\ (R_m/R_i)^{1/2} \quad (3)$$

(b) For the same reasons, if SP = —50 mv. $R_m/R_w \simeq 4$ and $R_s = 3/4\ R_m$.

$$R_i = F \times R_s = F \times 3/4\ R_m$$

$$\text{and } p = 0.865\ (R_m/R_i)^{1/2} \quad (4)$$

B. Oil-bearing limestones:

$$S_i = 0.7 \text{ and } R_i = \frac{F \times R_s}{0.5}$$

$$\text{and } F = 0.5\ \frac{R_i}{R_s}$$

Applying the same reasoning as before, we would obtain the following values:

1. Salt muds:

$SP = 0$; $R_m = R_w = R_s$

$$Ri = \frac{F \times R_m}{0.5} \text{ or } F = 0.5\ \frac{R_i}{R_m}$$

$$p = 1.4\ (R_m/R_i)^{1/2} \quad (5)$$

2. Fresh muds:

(a) SP = —100 mv.; $R_s = R_m/2$

$$R_i = R_m \times F$$

$$p = (R_m/R_i)^{1/2} \quad (6)$$

(b) SP = —50 mv.; $R_s = (3/4)\ R_m$

$$R_i = F \times (3/2)\ R_m$$

$$p = 1.22\ (R_m/R_i)^{1/2} \quad (7)$$

Resume of Above

Water-bearing limestones:

$SP = 0$; $p = (R_m/R_i)^{1/2}$

SP = —50 mv.; $p = 0.865\ (R_m/R_i)^{1/2}$

SP = —100 mv.; $p = 0.7\ (R_m/R_i)^{1/2}$

Oil-bearing limestones:

$SP = 0$; $p = 1.4\ (R_m/R_i)^{1/2}$

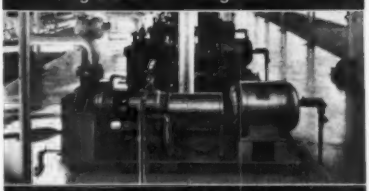
SP = —50 mv.; $p = 1.22\ (R_m/R_i)^{1/2}$

SP = —100 mv.; $p = (R_m/R_i)^{1/2}$

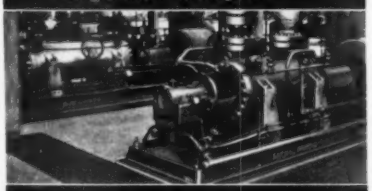
In the foregoing R_i, as already explained, is the value obtained from

When you specify **Pacific**

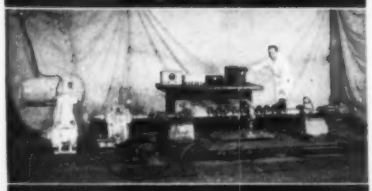
Single and Multi Stage Vertical



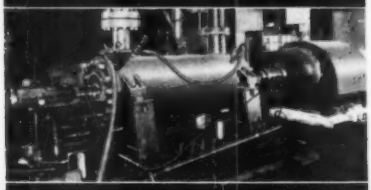
Single and Two Stage Process



Multi Stage High Pressure



Mechanical Research



Hydraulic Research

Precision Built

PUMPS

you have a feeling of pride and prestige — you know PACIFIC'S outstanding quality means you will receive *extra use life — extra service — extra economy*

Pacific Pumps are Moving Crudes — Raw and Finished Products for Petroleum and Petrochemical Industries in

ARGENTINA
ARABIA
BRAZIL
BELGIUM
CANADA
COLUMBIA
EAST INDIES
WEST INDIES
ENGLAND
EGYPT
FRANCE
FORMOSA
HOLLAND
ITALY
IRAN
ISRAEL
JAPAN
MEXICO
SOUTH AFRICA
UNITED STATES
VENEZUELA

Pacific Pumps inc.
ONE OF THE DRESSER INDUSTRIES
HUNTINGTON PARK, CALIFORNIA

PACIFIC *Precision Built* **PUMPS**

Export Office: Chanin Bldg., 122 E. 42nd St., New York. *Offices in All Principal Cities*

R_s (read on log) after correction by means of the departure curves.

It can be seen that for SP = —50 mv. there is a constant before the square root which is halfway between the constants for SP = 0 and SP = —100 mv.

Thus, in a rough way:

(For water-bearing limestones)

$$p = (R_m/R_t)^{1/2} \times [1 - (0.3 \times SP)/100] \quad (8)$$

(For oil-bearing limestones)

$$p = (R_m/R_t)^{1/2} \times [1.4 - (0.4 \times SP)/100] \quad (9)$$

In Relations 8 and 9, the SP has a negative value.

Porosity Index

From the foregoing, the porosity is given by $(R_m/R_t)^{1/2}$ multiplied by a correction factor "C" which is a function of the residual connate water for a given mud resistivity. The expression $(R_m/R_t)^{1/2}$ which is the base of the calculations will be called "Porosity Index," p_x. In Relations 8 and 9 above C = respectively:

$$1 - (0.3 \times SP)/100 \text{ and}$$

$$1.4 - (0.4 \times SP)/100$$

Fig. 2 gives the porosity index as a function of R_t/R_m. And, per cent porosity = porosity index × "C."

A major company made a study of the porosity in a limestone bed in West Texas. For this purpose the porosity obtained from core analysis was plotted against the "per cent deflection" of the limestone curve.

The per cent deflection was obtained in this way:

(a) The maximum resistivity found in the neighborhood of the pay section was used as the upper limit of resistivity.

(b) A very low value near the pay section was used as a lower limit. This value, incidentally, was extremely close to the zero line on the resistivity scale.

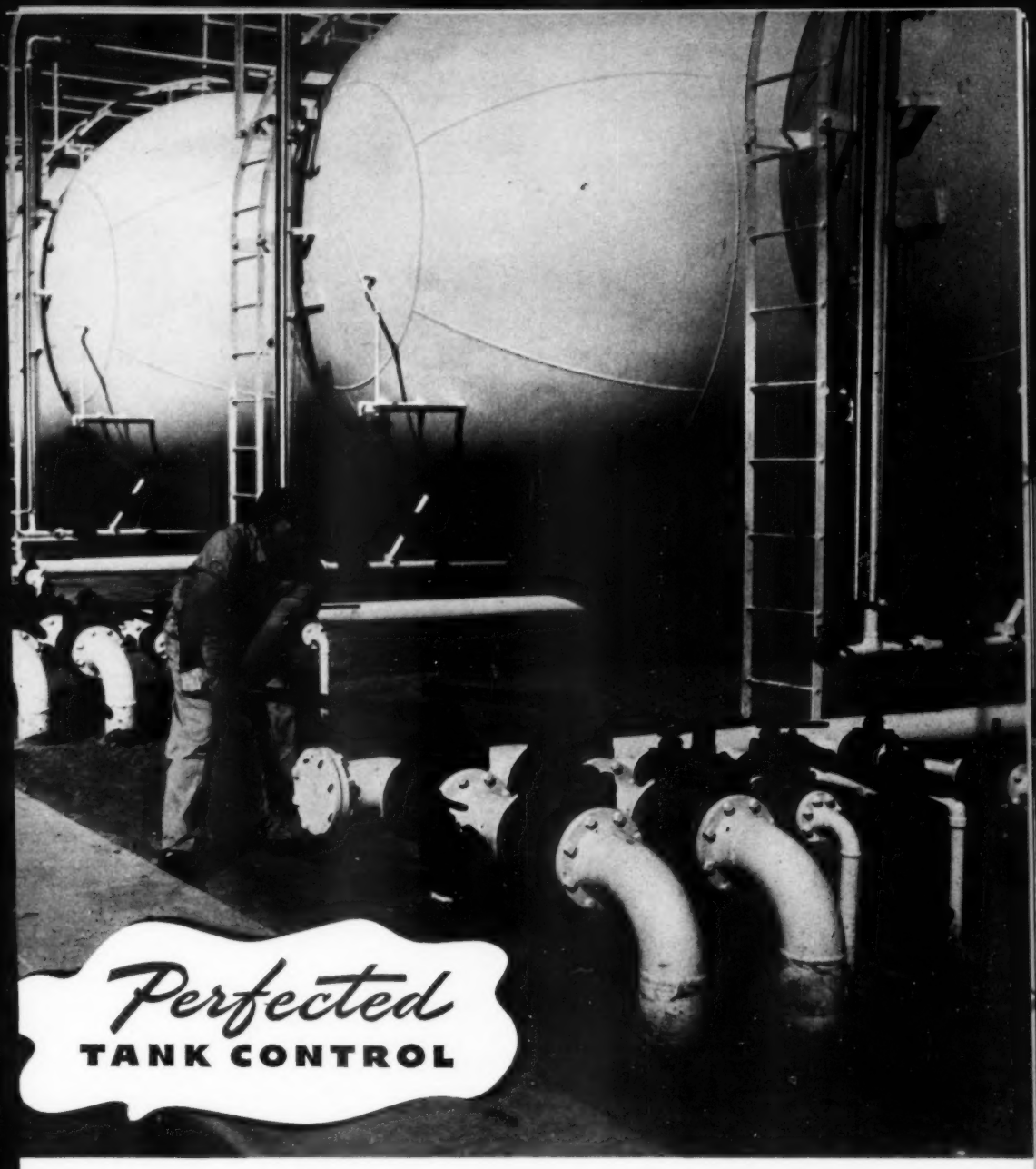
(c) The distance measured from the limestone curve reading to the upper limit was divided by the distance found between the lower and upper limit. This constituted the per cent deflection. Fig. 3 shows the result of this study.

Fig. 3 enabled the calculation of porosity in wells where no core analyses were made. The reserves calculated in this manner checked within 9 per cent of the figures obtained from "material-balance equation."

Let us study this procedure.

(a) For a given size hole and a given mud resistivity the limestone curve gives a finite value of resistivity when placed in front of an infinitely resistive formation.

This can be seen by consulting the departure chart for lateral devices, case of no invasion (Schlumberger Document No. 3, page 19). If the hole diameter is 8¾ in., the effective hole



NON-STICKING ★ NON-LEAKING ★ QUICK OPERATING

Tank controls have to be safe! Leaks must not occur. Quick operation is essential to switch from tank to tank and line to line. Only Nordstroms offer assurance of perfect performance, regardless of line fluid.

KEEP UPKEEP DOWN!

Nordstrom VALVES

–NOW AUTOMATICALLY LUBRICATED WITH Trade Mark Hypermatic Pats. Applied for

MULTIPLE ORIFICE METER HEADER

There's a NORDSTROM VALVE for every service

HYPRESEAL
Main Line Type

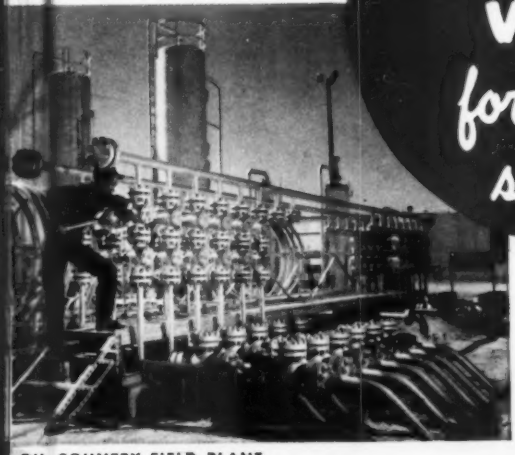
HYPRESEAL
Medium Pressure Typ

STANDARD
Venturi Type

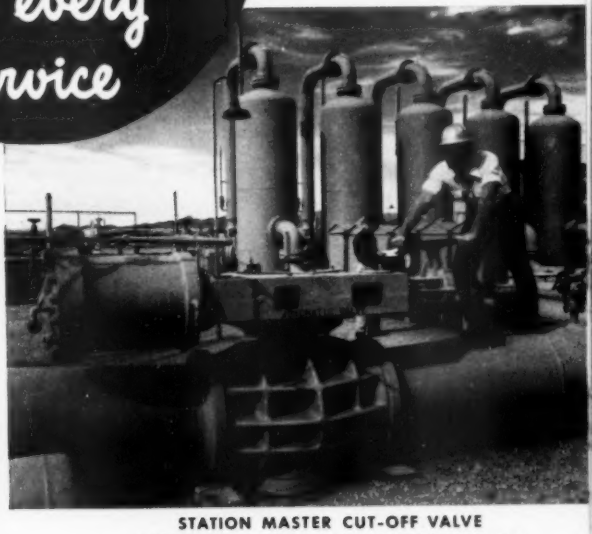
STANDARD
Screwed Gland Type

TWO-BOLT
General Service Type

SERVICE COCK
Lubricated

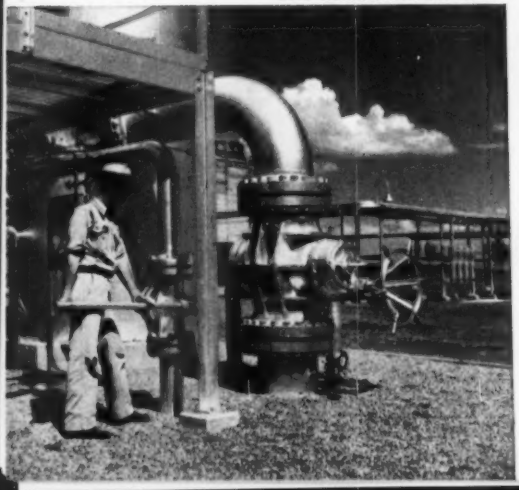


OIL COUNTRY FIELD PLANT



STATION MASTER CUT-OFF VALVE
—AUTOMATIC POWER OR MANUAL CONTROL

GAS DEHYDRATION UNIT



Nordstrom Valves

KEEP UPKEEP DOWN

ROCKWELL MANUFACTURING COMPANY

400 North Lexington Avenue, Pittsburgh 8, Pa.

Atlanta, Boston, Chicago, Columbus, Houston, Kansas City, Los Angeles, New York, Pittsburgh, San Francisco, Seattle, Tulsa . . . and leading Supply Houses. Export: International Division, Rockwell Manufacturing Company, 7701 Empire State Building, New York 1, N. Y.

diameter, allowing for the presence of the sonde, is:

$$(8.75^2 - 3.1^2)^{1/2} = 8.2 \text{ in.}$$

in which 3.1 in. is the diameter of the standard sonde. For the 32-in. limestone device, AO/d is then 32/8.2 = 3.9.

The intersection of the line corresponding to AO/d = 3.9 with the curve for $R_t/R_m = \infty$ occurs at $R_s/R_m = 125$.

Hence, 125 R_m is the upper limit of apparent resistivity for a hole diameter of 8¾ in.

Very high-resistivity formations give approximately the same value; and, consequently, the upper limit mentioned above can be readily obtained to a close approximation in front of a highly resistive formation.

(b) The lower limit can be taken on the zero line.

(c) The per cent deflection for an 8¾-in. hole becomes: $\frac{125\,R_m - R_s}{125\,R_m}$, or, dividing everything by R_m,

$$\text{Per cent deflection} = \frac{125 - R_s/R_m}{125} \quad (10)$$

(R_s is the apparent resistivity of the limestone sonde.)

Let us calculate this per cent deflection, and compare it to the porosity index, $(R_m/R_t)^{1/2}$ for several hole sizes (see porosity index per cent deflection tables).

Values from the tables are represented graphically in Fig. 4. Per cent deflection and corresponding porosity indexes are plotted for each hole size.

These curves show that the accuracy with which the per cent deflection can be translated into a porosity index decreases with the hole size. In other words, in very small holes the spacing of the limestone sonde, 32 in., may be too large for this purpose. These computations were made after correcting the hole size for the presence of the sonde. Calculations should be attempted with caution in 4¾-in. holes because the hole and sonde diameters are practically the same.

It should be remembered that the porosity index gives the porosity directly only in water-bearing limestones drilled with salt mud or in an oil-bearing limestone drilled with fresh mud having an SP of the order of —100 mv. Corrections are necessary according to Formulas 8 and 9 when the above conditions are not fulfilled.

It will be noticed that the plot of porosity from the core analysis versus the per cent deflection, given in Fig. 3, seems to follow very well the curve in Fig. 4. The data plotted on Fig. 3 are actually taken from a well drilled with an 8¾-in. bit, and the SP curve opposite the cored section showed a deflection only slightly less than 100 mv. Consequently, the theoretical calculation of the porosity seems to check quite well with core analyses in this case.

Note: This is the first of a two-part article. Part 2 will follow in an early issue.

References

1. Tixier, M. P., "Electric-Log Analysis in the Rocky Mountains," A.P.I. Drilling and Production Practice, 1949, and The Oil and Gas Journal, June 23, 1949, p. 143 et seq.
2. de Witte, Leendert, "Resistivity and Saturation Distribution in Infiltrated Zones of Porous Formations," The Oil and Gas Journal, July 27, 1950.
3. de Witte, Leendert, "Resistivities and Fluid Contents," The Oil and Gas Journal, Aug. 24, 1950.
4. Archie, G. E., "The Electric Log as An Aid in Determining Some Reservoir Characteristics," A.I.M.E. Technical Publication No. 1422.
5. Tixier, M. P., and Forsythe, R. L., "Application of Electric Logging in Canada," Quebec meeting, C.I.M.M., Apr. 10, 1951.
6. Wright, T. R., and Pirson, S. J., "Porosity Profile Determination from Electric Logs," St. Louis meeting, S.E.G., Apr. 23, 1951.
7. Schlumberger Documents Nos. 2, 3, and 4.

Jet-Bit Drilling

(Continued from page 139)

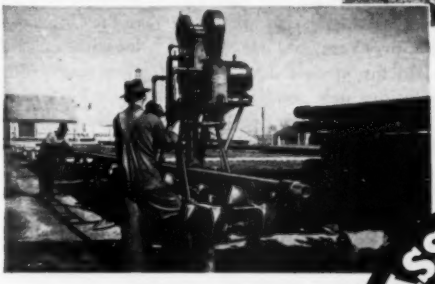
cided advantage is noted, and most operators try to keep their jet velocities well above 200 ft. per second, preferably in the range of 250 ft. per second or more, within the limits of their pump. Fig. 2 shows the nozzle

DRILL PIPE FOR RENT

No need to tie-up operating capital in drilling equipment! Just call "Associated"! Drill pipe and tools are maintained in excellent condition, ready for immediate delivery on rental basis. All six yards (listed below) are equipped to give you fast 24-hour service!

ALSO
- DRILL COLLARS
- KELLYS
- KELLY DRIVE BUSHINGS
- CORE BARRELS
- SAFETY JOINTS
- ROTARY SLIPS
- BLOWOUT PREVENTERS
- ROTARY TONGS
- ELEVATORS
- ROTARY SUBS

(Right) All pipe returned to our yards is steam cleaned and rigidly inspected.



(Left) Returned pipe is straightened, repaired to first class condition and threads properly lubricated before being replaced on racks.

MAIN OFFICE — HOUSTON, TEXAS

HOUSTON, TEXAS Phone CApitol 9596
OKLAHOMA CITY Phone 62-3555
ALICE, TEXAS Phone 1348
NEW IBERIA, LA. Phone 1553-J
ODESSA, TEXAS Phone 2331
HARVEY, LA. Phone UPtown 8585
CASPER, WYO.

ASSOCIATED OIL FIELD RENTALS INC.

This Costs Money, Too

...and it doesn't make you any friends!

Pipe for utility distribution systems deserves even better protection than pipe for pipelines. For one thing, it costs more to dig up when something goes wrong. Also those noisy pavement-breakers and traffic-snarling holes in the streets don't do your public relations any good.

Sure, factory coated pipe costs a shade more, but it pays off by staying in the ground longer and saving on maintenance expense.

P.S. To our pipe coating plants at Girard and Lorain, Ohio, we have added a third at Hammond, Indiana—centered in the steel pipe mill section of the Chicago Switching District. This location enables our customers in the west and southwest to take advantage of the Hill, Hubbell process with faster deliveries. Minimum freight rates include the privilege of coating and wrapping pipe in transit. The new plant has ample storage space.

Hill, Hubbell and Company

Division of GENERAL PAINT CORPORATION

Headquarters: 3091 Mayfield Road, Cleveland 18, Ohio

Leaders in Pipe Protection for a Quarter Century

velocities for various rates of circulation, based on standard jet size nozzles. As presently manufactured, most integral jet bits are equipped with two or three nozzles, and the fluid velocities from these two or three nozzle combinations are so close for all practical purposes, they may be grouped into individual graphs, as shown.

From Figs. 1 and 2 the minimum volume of mud to be used and the standard nozzle sizes available, can be determined.

Nozzle pressure losses.—The next step is determining the friction losses in the hydraulic system of the well, totaling these, and matching them with the pump and its power plant. Those losses that are constant regardless of depth should be considered first, and the largest of these is the power lost in the jet nozzles by turning mud volume into velocity. Fig. 3 shows these figures. At first glance it would appear that these values are very high, but it must be remembered that there is a large and somewhat similar loss in a conventional bit, and that these jet losses are only a few hundred pounds per square inch higher, and this few hundred pounds per square inch accounts for the only actual increased power requirements of jet drilling. Unfortunately, many rigs are using inadequate mud for best results in their present conventional drilling (see Fig. 1); therefore, the problem is not as simple as just saying a few hundred pounds pressure increase is required. The determination of the actual limits and ability of the rig is the desired soluiton for successful use of jet bits.

Drill-collar losses.—The amount of pressure lost through the inside diameter of drill collars can be an appreciable figure, and with some sizes of drill collar the loss in 100 ft. is more than encountered in 1,000 ft. of drill pipe. Drill-collar weight is essential, and enough drill collars should always be run to supply the full loading placed on the bit; however, in regard to wasted hydraulic power, it is advisable not to put excess drill collars in the hole. Fig. 4 shows pressure losses encountered for various size drill collars, and as there is usually a constant number of drill collars in the hole, this loss may be added to that determined for the jet nozzles.

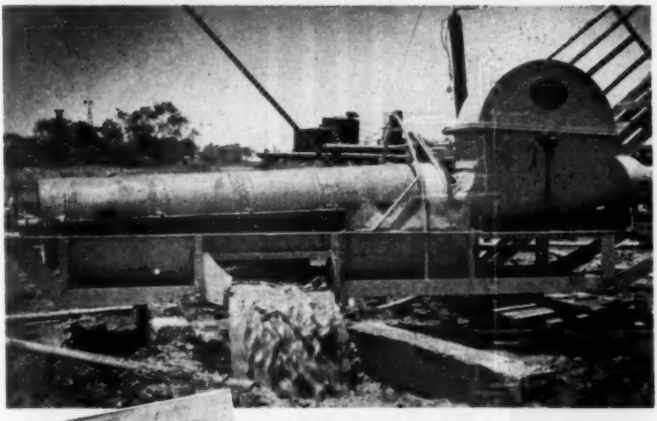
Other constant pressure losses.—The only other losses for the mud system that do not vary with depth are those of the rig itself, including such things as the standpipe, hose, swivel, kelly, surface piping, and anything else in the system. Due to differences between rigs, it is impossible to draw an accurate curve of these losses. Numerous tests have shown that the average rig with 4-in. standpipe, 3-in. i.d. kelly, 3-in. i.d. hose and normal piping has a loss of 35 psi. at 400 g.p.m. and about 60 psi at 600 g.p.m. For rigs with larger equipment, these loss figures can be cut in half.

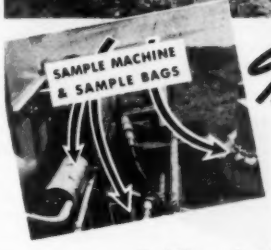
The total of the three constant pressure losses to be expected can now be added together, and compared with the total pressure the pump is capable of supplying. The pump will have an excess pressure rating over and above this constant loss (depending on the liners used), and this excess pressure will determine the depth to which the rig can drill, as it will be absorbed in the drill pipe and annulus.

Drill-pipe pressure losses.—In many cases where too small a drill pipe is being used, a rotary rig can save 100 or more pump horsepower by changing to larger pipe. To this can be added another saving effected in pump operating cost through less mud volume being required with the larger pipe. Recently, many Gulf Coast rigs have increased the size of their drill pipe and are now using jet bits with less pump pressure than formerly required for conventional bits. Fig. 5 shows the pressure losses that may be expected from common sizes of drill pipe now in use.

Annulus pressure losses.—As shown by Fig. 6, these are not as large as generally thought, but can amount to several hundred pounds per square inch for deep wells. The amount per thousand feet, as shown by the curves, should be added to the drill-pipe loss, and the sum of these two figures, when divided into the excess pump pressure determined above, will give

You'll want it for the SUPER JOB it does—for so little . . .





Thompson SELF-MOTIVATED SHALE SEPARATORS & SAMPLE MACHINES

- PROVEN PERFORMANCE
- ECONOMICAL OPERATION
- SAVES DRILLING COSTS

No drilling outfit today can afford to be without a Thompson. The Thompson does a two-fold job and does it better: (1) it thoroughly removes the shale and abrasives from valuable drilling mud, and (2) the SAMPLE MACHINE (standard equipment on all Thompson Separators) collects foot-by-foot cuttings to give an accurate analysis of the progress of the well. Drillers as well as geologists recognize this sample machine as one of the simplest and most economical methods of obtaining true samples.

Standardize on THOMPSON! YOU'LL SEE . . .
SOLD THROUGH SUPPLY STORES EVERYWHERE!

THOMPSON TOOL CO.
IOWA PARK, TEXAS

the depth to which a rig can satisfactorily drill with jet bits.

Mud weight and viscosity.—Under the velocity flow conditions usually encountered in a drilling well, viscosity has little effect on the pressure losses, and is generally disregarded by most engineers. An average accepted value was used in the calculations for these curves. On the other hand, mud weight does affect the pressure loss, and must be taken into consideration. All curves shown in the figures were drawn on the basis of mud weighting 10 lb. per gal., and this may be considered as a 100 per cent factor. If 11-lb. mud is used, the pressure losses shown should be increased by 10 per cent. Likewise, 9.5-lb. mud would mean a 5 per cent decrease.

Example

As an example of what can be done by a rig with a small pump, and as practice in use of these curves, let us examine the following problem:

Question: How deep can the following rig profitably use jet bits in digging an 8¾-in. hole? Mud weight to be 9.5 lb. per gallon.

Pump—7¼ by 14 with rating corrected for slippage as follows:

7¼-in. liner 470 g.p.m. 765 psi. 55 s.p.m.
7 -in. liner 435 g.p.m. 820 psi. 55 s.p.m.
6¾-in. liner 405 g.p.m. 890 psi. 55 s.p.m.

Engine—Will turn fully loaded pump at 55 s.p.m.
Drill pipe—4½-in. full hole.
Drill collars—8 collars, 240 ft. total length, 2¾-in. i.d.

Solution:

Average minimum mud required, g.p.m. (Fig. 1)	395
Possible jet sizes, in. (Fig. 2)	2⅝ or 3½
Jet nozzle velocities, ft. per second (Fig. 3)	210
Constant pressure losses:	
Psi. jet nozzles (Fig. 4)	390
Psi. drill collar (Fig. 5)	72
Psi. rig surface loss	35
Total for 10-lb. mud, psi.	497
Less correction for 9.5-lb. mud, psi.	—25
Total constant loss, psi.	472

By using a 6¾-in. liner this pump will supply slightly above the minimum average mud volume, and at a pressure of 890 psi.

Subtracting the constant pressure loss of 472 psi., calculated above, we find that the pump has 418 psi. excess pressure, to be used in drill-pipe and annulus losses.

Drill-pipe loss, psi. per 1,000 ft. (Fig. 5)	70
Annulus loss, psi. per 1,000 ft. (Fig. 6)	14
Total, psi.	84
Less correction for 9.5-lb. mud, psi.	—4
Total loss per 1,000 ft. of hole, psi.	80

Answer: This rig can drill with jet bits since (418/80) × 1,000 = 5,200 ft. To this can be added the 240 ft. of drill collars giving a final total of 5,440 ft.

In connection with the above problem, and concerning most other problems with power pumps, the pump is not fully loaded until the maximum calculated depth is reached. If the pump can supply an excess volume higher up the hole, this certainly should be done so that the rig can benefit from the increased nozzle velocity. This example can be carried further by working out limits for each size liner for the pump.

On the above pump we find that the 7¼-in. liner at capacity would not be advisable, but that the 7-in. liner could drill with 2⅝-in. jets to approximately 3,400 ft., and as it would give a higher nozzle velocity than the 6¾-in. liner, it would definitely pay the contractor to use this liner to this depth, then change to the 6¾-in. liner. In other words, the whole problem of jet drilling may be summed up in the statement that more mud volume, and higher nozzle velocity, give faster drilling.

CONTROL POWER BETTER

Clutch Engineering Help
for Transmission Designers
Whether your transmission problem involves a single or double plate or multiple-disc clutch, a power take-off or a speed reducer, the ROCKFORD engineering staff will contribute over a quarter century of successful clutch application experience toward its practical solution. Thousands of design engineers have utilized this help to fit maximum torque with minimum bulk and weight into compact product designs. Just write or phone for this ROCKFORD field engineering service.
BW

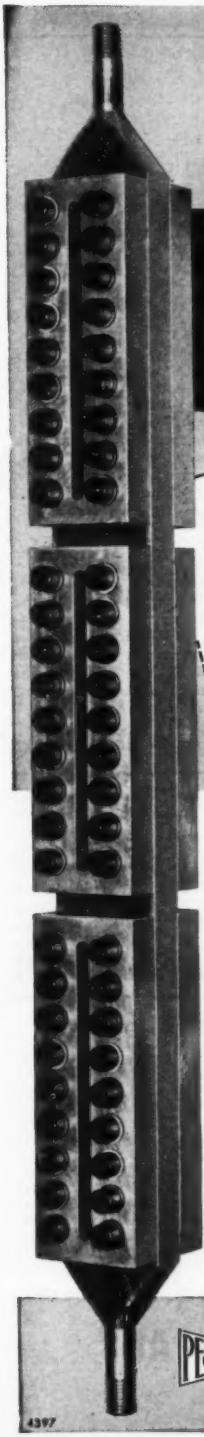
ROCKFORD CLUTCH DIVISION
BORG-WARNER
1305 Eighteenth Street, Rockford, Illinois

ROCKFORD CLUTCHES

BOOKS

FUEL OIL MANUAL. By Paul F. Schmidt. Published by Industrial Press, 148 Lafayette Street, New York 13. 160 pp. $3.50.

The author, who is chief chemist for Allied Oil Co., Cleveland, presents practical information on properties, selection, handling, and burning for buyers, users, and sellers of fuel oil. Theory and involved discussions of interest only to chemists or refiners are avoided, technical language is used as little as possible, and all terms are fully explained. A chapter is devoted to each of the various important properties of fuel oil.



for operating pressures up to

10,000 psi

PENBERTHY transparent LIQUID LEVEL GAGES

Another PENBERTHY First

Patent Applied for

These gages were developed by Penberthy in answer to persistent demands from the process industries and various laboratories for a gage with UNOBSTRUCTED VISIBILITY at service pressure ratings up to 10,000 psi. They are tested to 15,000 psi. Temperature rating is 250° F dry gas . . . 300° F wet gas.

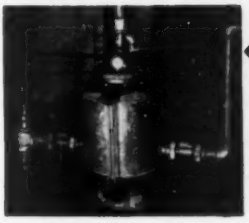
In addition to their value as liquid level indicators, these gages are useful as reaction chambers, equilibrium cells, high pressure manometers, etc.

The standard gage body containing the liquid chamber is forged carbon steel but stainless steels are available. Design is such that glass is entirely relieved of bolting pressure . . . providing a better seal and avoiding those stress concentrations which cause so much glass breakage.

These Penberthy 10,000 psi gages are of proven dependability . . . they have been in field service for more than two years. Write us regarding your requirements.

OTHER PENBERTHY PRODUCTS

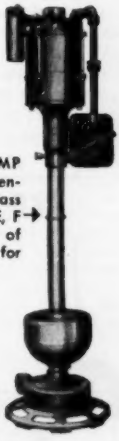
PENBERTHY REFLEX GAGE. Empty space shows white, liquid shows black. You can't misread. Available in special alloys and now available for operating pressures up to 5,000 psi. Ask for Catalog 35.



PENBERTHY CYCLING JET PUMPS. Automatically operated by air, gas or steam pressure . . . Will pump without clogging any liquid that will flow through pipes. Ask for Bulletin 5030.

PENBERTHY EXPLOSION-PROOF SUMP PUMPS. Motor and switch totally enclosed. Underwriter approved for Class 1, Group D, and Class 2, Groups E, F and G hazardous location. Made of copper and bronze throughout. Ask for Bulletin 4929.

PENBERTHY EJECTORS. A simple jet pump operated by air, water or steam. Needs no lubrication . . . will not get out of order. Ask for Bulletin 5080.



PENBERTHY ALSO MANUFACTURES A COMPLETE LINE OF LIQUID LEVEL GAGES IN BRONZE, IRON, STEEL AND ALLOYS

PENBERTHY INJECTOR COMPANY

DIVISION OF THE BUFFALO-ECLIPSE CORPORATION

DETROIT 2, MICHIGAN

Established 1886 *Canadian Plant, Windsor, Ontario*

4397

AIRCO

YOUR SUPPLY DEPOT
for
OXYACETYLENE FLAME AND ELECTRIC ARC WELDING AND CUTTING EQUIPMENT AND SUPPLIES

AIRCO GASES AND CARBIDE

Airco Oxygen is produced and tested under the most rigid scientific procedures, and is guaranteed to be 99.5% pure in the cylinder. High purity assures maximum speed and economy in cutting, and greater efficiency in welding.

Airco Acetylene has been proved by use and test to be the most economical fuel gas for pipe welding and other flame welding operations.

Other Airco gases such as Nitrogen, Hydrogen, Carbon Dioxide and the rare gases Argon, Neon, Helium, Xenon, and Krypton (and mixtures thereof) for commercial and laboratory use are available through a nationwide distribution system. Nitrogen and Oxygen may be also obtained as a liquid and Carbon Dioxide in solid form.

National Carbide (in the red drum) assures the user of a high acetylene yield – better than 4.5 cu. ft. per lb. It is made from the finest available coke and limestone by the most modern manufacturing methods. It is evenly sized and dust-free. Available in five sizes in 25-lb. and 100-lb. drums, 2-lb. and 10-lb. cans.

OXYACETYLENE APPARATUS AND SUPPLIES

Airco No. 846 Welding, Heating and Cutting Outfit. This is the outfit for heavy-duty as well as light and medium day-by-day production welding and occasional cutting. The five tip assemblies will weld metals from the lightest gauge to the heaviest section. Other special purpose tips make possible additional profitable operations such as flame hardening, flame cleaning, silver brazing and the heating of large sections prior to welding. Also included in the outfit are two dual-stage regulators, wrench, goggles, spark lighter, and a special cutting attachment for cutting metals up to 1" thickness.

Airco Tensile and Bend Testing Machine. This machine permits rapid testing of weld specimens in the shop, laboratory, or on field operations. Guided bend tests, transverse tension, and longitudinal all-weld metal tension tests are quickly made with this compact Airco machine.

AIRCO HARDFACING ALLOYS add 2 to 25 times LONGER SERVICE LIFE to worn and new parts
Whatever your wear problem – heat, corrosion, impact or abrasion – Airco's New Hardfacing Alloys will give you the most effective solution. With one application of these wear-retarding materials, the service life of both worn and new parts is increased, in some cases, at least 25 times.

Airco Pipe Cutting and Beveling Machine. This portable flame cutting machine is the fastest, most economical means of preparing pipe for welding. It simultaneously cuts and bevels pipe to any angle. It is chain driven and turns around pipe or remains stationary as pipe is revolved. Airco also has available a full line of other portable and stationary shape and straight line oxyacetylene cutting machines.

ARC WELDING MACHINES, ELECTRODES AND ACCESSORIES

The Wilson "Yellow Jacket" is a ruggedly constructed, gasoline engine-driven generator that has proved ideal for field welding. Features include compactness, improved automatic idling device, close coupling of drive and generator. Made in 300 and 400 amp. sizes. Also available are 200 amp. Wasp and Hornet Specials with air-cooled engines.

The Wilson "Hornet," famous for its smooth, steady arc, easy regulation, and reliable service, is ideal for general purpose DC welding. Made in 200, 300, 400 amp. sizes.

The Wilson "Bumblebee" AC welders (indoor and "All-Weather" models) are supplied in 200, 300, 400 and 500 amp. sizes and other AC units in 750 and 1000 amp. sizes.

A complete line of shielded arc AC and DC electrodes. Airco No. 78E is ideal for DC all-position, general purpose welding where excellent physical qualities are needed. Airco No. 387 is recommended for single or multiple pass DC or AC welding on rusty work and where fit-up is poor. Airco No. 230 is a "top-notch" electrode for all-position AC welding.

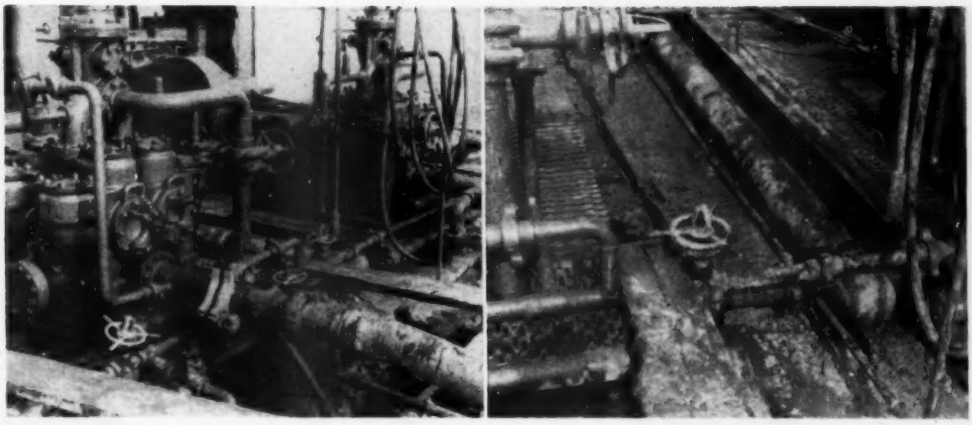
Arc Welding accessories include helmets, holders, clamps, gloves, brushes, etc.

***For additional details on any of these products, please contact the nearest Air Reduction Magnolia office.**

AIRCO **AIR REDUCTION MAGNOLIA COMPANY**

A Division of Air Reduction Company, Incorporated

Beaumont • Corpus Christi • Dallas • El Paso • Fort Worth • Hobbs
Houston • Oklahoma City • San Antonio • Shreveport • Tulsa • Wichita Falls



Mud-Pump Connections

ON its lighter rigs (6,000 ft.) one drilling company uses an efficient arrangement of mud-pump connections. Each rig employs two pumps which rest on a timber mat at a determined distance apart. A union connects a rubber suction hose at each pump. Half of the union is permanently attached to the pump. When the pumps are placed in proper operating position, the unions can be run up quickly and easily.

Discharge connections for both pumps are matching. Each pump has a discharge header from which high-pressure mud is supplied to its various end uses.

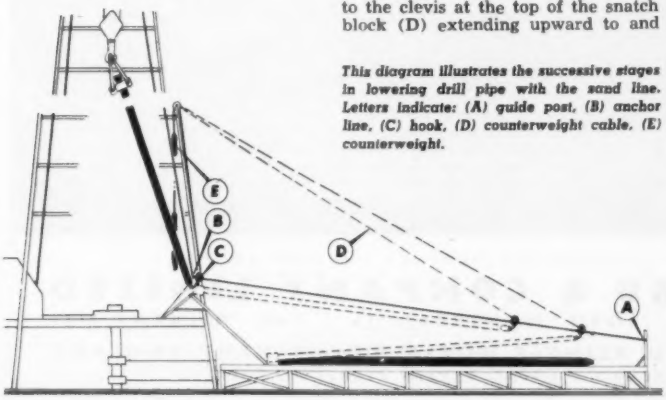
Main mud flow is from each pump header to a section of large-size pipe lying between the pumps thence to a standpipe. Fittings between the headers and the large pipe are identical, each being fitted with matching halves of a union which can be made up quickly. Safety-valve relief lines are attached to the suction of the respective pumps with lug-type unions so the piping can be easily removed for repairing a unit.

Laying Down of Pipe Expedited by Novel Sand-Line Device

ONE drilling company has simplified the laying down of a string of drill pipe as it is brought out of the hole with the use of the sandline. The free end of the sandline is secured to a guide post (see cut) at a height calculated to bring the end of a joint of pipe to the walk between the pipe racks on either side. The line is anchored on the derrick floor with as much tension as necessary to keep the cable tight. (B.) The line is about 3 ft. high at this point so that a joint of pipe will clear equipment.

A heavy sawhorse is placed at the edge of the derrick floor near the top of the drill-pipe bumper board, so that an extension can be added to bring the entire board flush with the top rail of the supporting member. The sandline is supplied with a snatch block (C) and fitted with a heavy hook fashioned to fit securely in the opening of the pin end of the tool joint.

A counterweight cable is attached to the clevis at the top of the snatch block (D) extending upward to and over a sheave on one of the derrick girts to a weighted box (E) heavy enough to return the snatch block to a point above the sawhorse and bumper board extension. The snatch block does not require guiding by a man on the floor.



This diagram illustrates the successive stages in lowering drill pipe with the sand line. Letters indicate: (A) guide post, (B) anchor line, (C) hook, (D) counterweight cable, (E) counterweight.

Working procedure.—As the joint of pipe is broken out of the string it is moved from the rotary table to the men stationed at the sawhorse. One man sets the hook of the snatch block in the pin opening while the elevators are lowered thereby shoving the pin end suspended by the sandline outward. As the box end comes to rest on the sawhorses, the elevator latch is loosened and another shove sends the joint sliding down the bumper to rest on cribbing placed on the walk.

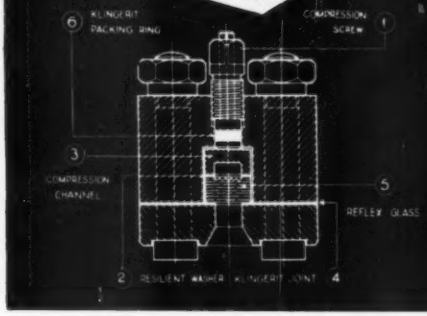
The pin end of the joint is slightly above the cribbing so that the man on the walk can easily free the snatch block by striking the hook sharply. While this joint is being moved to the walk, another joint is removed from the string ready to be attached to the hook as soon as it returns to the derrick.

The guide post or snubbing post to which the free end of the sandline is attached may be a heavy stake, or piece of 2 or 3-in. pipe driven well into the ground, or even a highline or telephone pole if one is handy.

Klinger LIQUID LEVEL Gages

FOR THE OIL INDUSTRY

Klinger S250, Size VI/VI, Reflex Level Gage for working pressures up to 4,000 p.s.i. (250 atmospheres).



The Klinger S. Type series, of high pressure Liquid Level Gages, is specially designed for modern chemical processes in oil refining and derivant producing plant, and is made in the following standard range for the indicated working pressures :

S.120 (2,000 *p.s.i.*)	S.250 (4,000 *p.s.i.*)
S.300 (5,000 *p.s.i.*)	S.400 (6,000 *p.s.i.*)

These are so construeted that the glass is not subjected to high mechanically applied stresses in order to make a tight joint. Tightness of the joint is provided by the internal fluid pressure, so that the glass is evenly loaded and free to adjust itself in the gage body to inequalities of expansion.

The compression screw (1) provides initial pressure only between the reflex glass (5) and the "Klingerit" joint (4), via the compression channel (3) and the resilient washer (2). The actual sealing pressure on joint (4) at high pressures is given by the internal fluid pressure on the rear of the reflex glass (5). Leakage past the compression screw (1) is prevented by the "Klingerit" packing ring (6).

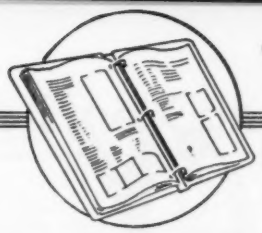
WRITE FOR CATALOG AND FURTHER PARTICULARS:

JOSEPH ROBB & COMPANY LIMITED

5575 COTE ST PAUL ROAD MONTREAL 20 TEL. WILBANK 3181

RICHARD KLINGER LTD. KLINGER WORKS, SIDCUP, KENT, ENGLAND

LONDON OFFICE: BURWOOD HOUSE, CAXTON STREET, LONDON, SW1



THE REFINER'S notebook

No. 97

Initial Steps in Instrument Installation

by H. A. Hulsberg*

PROPER storage of instruments frequently is given little consideration. Electrical and other instruments which may be damaged by moisture should be protected by proper housing. A heated room is required when low temperatures may cause condensation with consequent rusting and insulation damage, or may cause freezing of standard cells, ink, or liquid chemicals. After opening and identification, items should be reboxed wherever possible to protect against petty theft, loss due to confusion, or damage.

Upon installation of the major part of an instrument, any accessories which are not immediately needed should be boxed, labeled, and eventually turned over to the plant instrument man, or whoever is responsible for storage of such items. This includes charts, ink, chemicals, spare parts, special tools, valve lubricant, and the like.

If dry cells included with electrical instruments are not to be used for some time, they may be turned over to plant stock, to be replaced by fresh ones later. As items leave the storehouse for installation, a notation on the invoice or order may be made to avoid misplacement and confusion.

The roughing-in stage of installation is that in which the heavier pieces of equipment are put into place. At this time control valves and orifice flanges are installed in piping, the control board is set up, instrument air or hydraulic supply systems are erected, and in general the major pieces of control equipment are installed, but not interconnected. This stage is particularly important with large pipe, since mistakes at this point are very costly to correct.

*Head of instrument engineering and service, Universal Oil Products Co. Paper presented at I.S.A. meeting, Houston, 1951.

Project No.
Checked by

ORIFICE FLOW METER INSTALLATION CHECK LIST

LOCATION:

IDENTIFICATION NUMBER:

PRIMARY ELEMENT:

1. **Straight Length Upstream:** ____ **inches.**
   Required Minimum: ____ **inches.**
2. **Straight Length Downstream:** ____ **inches.**
   Required Minimum: ____ **inches.**
3. **Pipe Size—Upstream—Actual** ____ **inches I.D.**
   Downstream—Actual ____ **inches I.D.**
   Specified ____ **inches I.D.**
4. **Orientation of Flanges:**
   Taps
   Bolts
5. **Type and Location of Taps:**
   Type ____ **Upstream** ____ **inches Downstream** ____ **inches.**
6. **Orifice Plate:**
   Checked against specification
   Proper face upstream
   Orientation of drain or vent hole
   Orientation of eccentric orifice
   Gaskets
   Orifice tag

TRANSMITTER OR METER:

Meter per specification
Piping per specification
Mercury added
Balanced
Seal added
Calibration checked
Transmission line tested

Flow-Controller Example

As a specific example, consider the installation of the orifice flanges and the control valve of a flow controller. The accompanying check list shows a suggested procedure for the installation of the flanges. The flanges are first located in the proper line, which is filled in by name. The instrument identification number is next filled in, which in this case is FRC-32.

The orifice flanges are then located at a point in the line to give the required straight length of pipe preceding and following the flanges. The actual straight length is filled in to keep this in mind. Next the orientation of the flanges is checked off as OK, after the specifications have been checked, and it has been decided that the connections should come out of the north side of the line, rather than the top or bottom.

The actual pipe inside diameter is then measured, marked down, and checked against the specification. In this case it is 2.91 in. upstream, and 2.90 in. downstream. The flanges are now welded into place. Before the orifice plate is installed, the taps are checked for rough inside surfaces and for being open rather than obstructed.

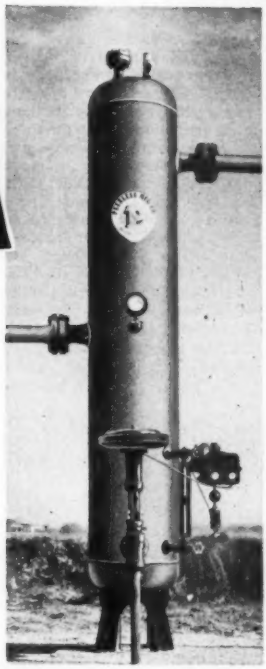
Upon installation of the orifice plate, under "Orientation," "Proper Face Upstream" is checked off as O.K., the square edge having been faced upstream. In this case, it is an eccentric orifice in a horizontal line to pass sediment, so the orifice is oriented on the bottom of the pipe, and so marked on the check list.

There is no drain hole in the plate, so the orientation need not be checked; hence the remark "none." After installation of the plate with gaskets, the plate is bolted in place, making sure that the gasket does not obstruct the orifice or taps, and that the orifice tag is present and plainly visible.

PEERLESS GUARANTEES EFFICIENCY!

efficiency

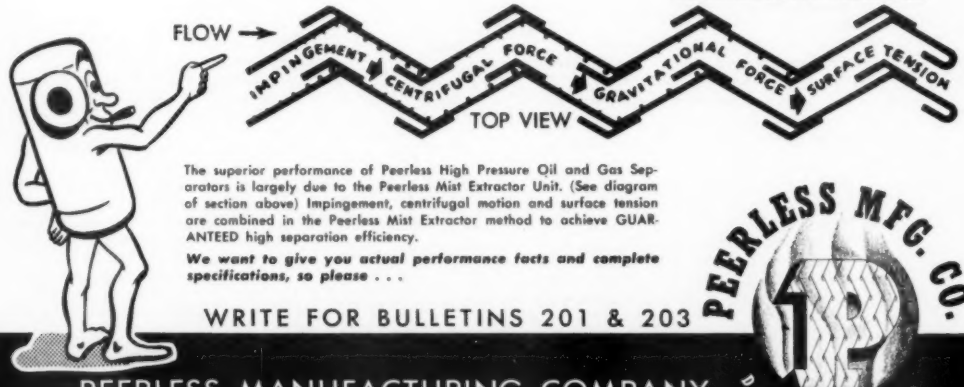
PEERLESS HIGH PRESSURE OIL & GAS SEPARATORS



— Peerless Separators are so efficient that they are GUARANTEED to reduce liquid loss — due to entrainment — to less than .1/10 gallon MMSCF of gas. (See diagram of Mist Extractor Unit below)

— Extra high quality workmanship plus the use of highest quality accessories provide other essential advantages of Peerless High Pressure Oil and Gas Separators.

— Over 16 years experience in solving special separation problems gives Peerless a decided advantage in recommending the most efficient type and size separator with which to do the job — at the LOWEST COST!



The superior performance of Peerless High Pressure Oil and Gas Separators is largely due to the Peerless Mist Extractor Unit. (See diagram of section above) Impingement, centrifugal motion and surface tension are combined in the Peerless Mist Extractor method to achieve GUARANTEED high separation efficiency.

We want to give you actual performance facts and complete specifications, so please . . .

WRITE FOR BULLETINS 201 & 203

PEERLESS MFG. CO.

DALLAS TEXAS

PEERLESS MANUFACTURING COMPANY

Walnut Hill Lane at Old Denton Road

P. O. Box 7193 DALLAS, TEXAS DI-8431

AGENTS IN:

Hobbs, N. M., Houston, Odessa, Wichita Falls, Alice, and El Paso, Texas. Tulsa, Denver, Philadelphia, Phoenix, Los Angeles, Boston, Cleveland, New York City, Buffalo, Chicago, Richmond, Louisville.

Pipe-Line Construction

FOLLOWING is a tabulation of pipeline projects which are planned or under construction. Included are crude-oil, products, and natural-gas lines. This list is compiled from surveys made by The Oil and Gas Journal.

Crude-Oil Pipe Lines

Alberta-Vancouver Oil Pipe Line Co. (Brokaw, Dixon, McKee).—972 miles, 16-in., proposed, Edmonton via Pincher Creek, Alta., Idaho and Washington states to Vancouver, B. C.

Continental Pipe Line Co.—105 miles, 8-in., authorized, Rincon to northwest of Sullivan City on to Port Isabel, Tex. Completion date 1952.

Continental Pipe Line Co.—217 miles, 12-in., authorized, Wichita Falls, Tex., to Ponca City, Okla. Completion date 1952.

Derby Oil Co.—15 miles, 6-in., authorized, Wichita to Bentley, Kans. Completion date 12-51.

Gulf Refining Co.—87 miles, 14-in., contracted, Lumberton, Miss., to Mobile, Ala. Anderson Bros. Completion date, 1-1-52.

Ohio Oil Co.—117 miles, 22-in., under way, Sheridan, Ind., to Lima, Ohio. R. A. Conyes, contractor.

Pan American Pipe Line Co.—27 miles, 36-in., Genoa to Texas City, Tex. Completion date 12-52.

Pan American Pipe Line Co.—40 miles, 14-in., Arden Station in Irion County to Eldorado Station in Schleicher County. 6-52.

Platte Pipe Line Co.—1,075 miles, 16-20-in., under way, Worland, Wyo., to Wood River, Ill. Completion date 1952.

Platte Pipe Line Co.—573 miles, 16-20-in., under way. Winchester, Wyo., to Brule, Neb. R. H. Fulton & Co. (Sections 1, 2, 3, and 4.—Section 1, 126 mi. of 16-in., remainder 20-in.). A. A. Carrigan, spreadman at Casper, Wyo., field office.

Platte Pipe Line Co.—142 miles, 20-in., under way, near Marysville, Kans., to Holdredge, Neb. Bishop & Lock (Section 5); H. LaQuey, spreadman.

Platte Pipe Line Co.—100 miles, 20-in., under way, northern edge of Kansas. Rumsey Bros., contractor of Section 6.

Platte Pipe Line Co.—(Section 7). 274 miles, 20-in., Missouri River to Salisbury, Mo., and (Section 8) Salisbury to Mississippi River, under way, field office, Mexico, Mo., B. C. Hall, spreadman; River crossing field office, Hartford, Ill., Dick Jernigan, spreadman.

Progress Pacific Pipe Line Co.—900 miles, 20-in., proposed, Permian basin, West Texas, to California.

Rancho Pipe Line System.—484 miles, 24-in., authorized, McCamey to Houston, Tex. Company crews. Completion date late 1952. (Joint project with Sinclair Pipe Line Co., Pan American Pipe Line Co., Tidewater Pipe Line Co., Nantucket Pipe Line Co., and Phillips Pipe Line Co., with Shell Pipe Line Corp. handling construction and operation.)

Roosevelt Oil & Refining Corp.—22 miles, 4 and 6-in., authorized, St. Helens to Norwich, Mich.

Service Pipe Line Co.—19 miles, 16-in., under way, Raytown to Sugar Creek Ref., Mo. Sheehan Pipe Line Const. Co., contractor. J. W. Brown, spreadman at Raytown, Mo.

Service Pipe Line Co.—29 miles, 20-in., authorized; Drumright, Okla., to Humboldt, Kans.; 30 miles, 20-in., contracted, Freeman to La Plata, Mo., G. G. Griffis Const. Co.; 24 miles, 10-in., contracted, Denton, N. M., to Wasson, Tex., Crossley and Hardy, contractor.

Shell Pipe Line Corp.—66 miles, 8-in. authorized, Gohlke to La Grange, Tex. Company crews. Completion date 1952.

Sinclair Pipe Line Co.—674 miles, 22-24-in. authorized: Drumright, Okla., to E. Chicago, Ind. Completion date 1952.

West Texas Gulf Pipe Line Co.—467 miles, 26-in., authorized, Colorado City to Wortham, Tex., 26-in.; Wortham to Sour Lake, Tex., 24-in. Completion date 10-52.

West Texas Gulf Pipe Line Co.—114 miles, 20-in., authorized, Wortham to Longview, Tex. Completion date 10-52.

Products Pipe Lines

Bell Oil & Gas Co.—150 miles, 6-in., planned, Ardmore to Drumright, Okla. (Includes 114 miles, 8-in.; 32 miles, 6-in.)

Buckeye Pipe Line Co.—430 miles, 14-in., proposed, Linden, N. J., to Allentown, Pa. Junction; Chelsea, Pa., via Allentown Junction to Auburn, Rochester, Syracuse and Oswego, N. Y. Start 1952; finish 1953.

Ohio Oil Co.—24 miles, 8-in., authorized, East St. Louis to Wood River, Ill.

Phillips Oil Co.—28 miles, 12-in., authorized, Sweeny to Freeport, Tex.

Phillips Pipe Line Co.—40 miles, 10-in., through Monteau, Cole, Osage and Gasconade counties, Missouri. Trojan Const. Co. E. L. Maggard, spreadman at Linn, Mo.

Phillips Pipe Line Co.—46 miles, 12-in., under way, looping from Buffalo, Okla., to Borger, Tex. Arey Phillips Const. Co. 10-51 completion date.

Phillips Pipe Line Co.—48 miles, 12-in., under way, looping from Wichita, Kans., to Buffalo, Okla. G. G. Griffis Const. Co. Joe Bishop, spreadman, at Wichita, Kans. 11-51 completion date.

Phillips Pipe Line Co.—101 miles, 8-in., under way, looping from East St. Louis to Decatur, Ill. Brown Lite Co., contractor. R. E. Carricker, spreadman at Taylorville, Ill.; Hedge Edmonds, spreadman at Litchfield, Ill. Completion date 11-51.

Phillips Pipe Line Co.—74 miles, 8-in., under way, looping from Decatur, Ill., to East Chicago, Ind. Somerville Const Co., contractor. 12-51 completion date.

Phillips Pipe Line Co.—69 miles, 12-in., authorized, looping from Paola to Wichita, Kans.

Phillips Pipe Line Co.—137 miles, 10-in., authorized, looping from Paola, Kans., to East St. Louis, Ill. Completion date 11-51.

Plantation Pipe Line Co.—707 miles, 14 and 18-in., under way, Baton Rouge to Charlotte, N. C., 275 miles, 14-in., under way, Bremen to Charlotte, N. C.; 432 miles, 18-in., under way, Baton Rouge to Bremen, Ga.; 220 miles, 18-in., Baton Rouge to Mississippi-Alabama state line; Williams Brothers Co. David R. Williams, Jr., project manager.

Progress Pacific Pipe Line Co.—900 miles, 10-in., proposed, California to West Texas.

Salt Lake Pipe Line Co.—Proposed, Pasco, Wash., to Puget Sound.

Sinclair Pipe Line Co.—8-in., proposed, Sinclair, Wyo., to Salt Lake City, Utah; 10-in., Houston to Baton Rouge; 16-in., Kalamazoo to Detroit; 20-in. Marcus Hook to Bayonne, N. J.; East Chicago to South Bend, Ind.

Standard Oil Co. (Ind.).—122 miles, 8-in., under way, Neodesha, Kans., to Belton, Mo. Bills & Troth Construction Co., Carl Bills, superintendent, at Armory Building, Neodesha. Completion date 1952.

Standard Oil Co. (Ohio).—17 miles, 6-in., authorized, Toledo to West Toledo, Ohio.

Tuscarora Oil Co., Ltd.—61 miles, 10-in., authorized, Knappenberger to Midland, Pa.

Natural-Gas Pipe Lines

Algonquin Gas Transmission Co.—278 miles, proposed, Greenwich, Conn., to Boston area; 492 miles, proposed, laterals New England area.

Allied Gas Co.—24 miles, 6⅝-in., proposed, McLean to Champaign County, Ill.

Amore Gas Utilities Co.—11 miles, 8-in.

Men, Machines and
PIPELINE
"KNOWHOW"

Pioneering
PIPELINERS
Since 1915

IT'S AN OK JOB IF IT'S DONE BY
OKlahoma
CONTRACTING CO.

6612 Harry Hines
DALLAS, TEXAS

authorized KA-5 loop, Priceton and Athens, W. Va. Completion date December 1951.

Amere Gas Utilities Co.—16 miles, 8⅝-in., proposed, loops from Mercer County to Princeton, W. Va.

Amere Gas Utilities Co.—15 miles, 8⅝-in., proposed, near Dameron to Flat Top, W. Va.

Arkansas Louisiana Gas Co.—16 miles, 8⅝-in., Claiborne Parish to Columbia County, Ark.

Associated Natural Gas Co.—88 miles, authorized, Missouri.

Associated Natural Gas Co.—14 miles, 6-in., under way, Sikeston to Charleston, Mo. Boot Heel Construction Co. Completion date 12-1-51.

Carolina Natural Gas Corp.—185 miles 2-12-in., proposed, lateral lines off Transcontinental in North and South Carolina.

Cities Service Co.—80 miles, 4-22-in., under way, Grant, Haskell, and Seward counties, Kansas. Cheek Construction Co. Completion date 12-1-51.

Cities Service Gas Co.—179 miles, 4-30-in., gathering system in vicinity of Ulysses, Kans. Vaughn & Taylor Const. Co., Inc. D. D. Vaughn, spreadman, Ulysses.

Coast Counties Gas & Electric Co.—40 miles, 3, 4, and 8-in., planned. Coast and Valley region, California.

Colorado Interstate Gas Co.—250 miles, 20-in., under way, Kit Carson, Colo., to Amarillo, Tex. R. H. Fulton & Co., contractor. Jerry Nash, spreadman at Lamar, Colo.

Commonwealth Natural Gas Corp.—537 miles, 20-in., proposed, West Bend, Ky., to Norfolk, Va.

Consolidated Gas Utilities Corp.—24 miles, 10¾-in., authorized, Marlow field to Fort Sill, Okla. Completion date 12-1-51.

Cumberland and Allegheny Gas Co.—46 miles, 10-in., authorized, Mountain Lake Park, Md., to Preston County, W. Va.

Dow Chemical Co.—70 miles, various sizes, Midland, Saginaw, and Bay City, Mich.; Mahoney Contracting Co., contractor, Ralph Bucher, spreadman at Midland.

East Ohio Gas Co.—65 miles, 26-in., under way, near Petersburg to Cleveland, Ohio. Williams Bros., contractor. Completion date 12-1-51.

East Tennessee Natural Gas Co.—172 miles, 22-in., authorized, Greenbrier to Oak Ridge, Tenn.

East Tennessee Natural Gas Co.—100 miles, 16-in. proposed, Knoxville to Kingsport, Tenn.

Egyptian Natural Gas Co. 80 miles, 6-8 in., authorized, Norris City to Salem-Centralia, Ill., area.

El Paso Natural Gas Co.—122.9 miles, 30 in., proposed, looping along main line in Texas, New Mexico, Arizona.

Empire Southern Gas Co.—22 miles, 2-3-4-in., authorized, Ozona, Crockett County, Texas, to Ozona Distribution system.

Equitable Gas Co.—17 miles, 16-in., under way, near Pittsburgh. H. L. Gentry Const. Co., contractor. Lavern Curtis, spreadman at Sewickley, Pa.

Georgia Gas Co.—32 miles, 4½-in., proposed. Bogart to Gainesville, Ga.

Glacier Gas Co.—285 miles, 20-in., proposed, Kalispell, Mont., to Spokane, Wash.

Glacier Gas Co.—120 miles, 16-in., proposed, Spokane to Hanford, Wash.

Glacier Gas Co.—91 miles, 8⅝-in., proposed, Spokane to Lewiston, Idaho.

Glacier Gas Co.—130 miles, 12¾-in., proposed, Spokane to International Boundary at Trail, British Columbia.

Grand Valley Pipe Line Co.—105 miles 8-10-in., planned, Piceance Creek field to Rifle on to Grand Junction, Colo.

Gulf Michigan Transmission Corp.—680 miles. 30-in., proposed, Perryville, La., across Arkansas, Missouri, and Illinois to terminus near St. John, Ind.

Home Gas Co.—17 miles, 12-in., proposed, loops from Hancock to Sanford, N. Y.

Iowa-Illinois Gas & Electric Co.—41 miles, 10-in., authorized, Washington County to Cedar Rapids, Iowa.

Kansas-Nebraska Natural Gas Co.—40 miles, 6-in., under way. Albion to Norfolk, Neb. Jayhawk Const. Co., Inc., contractor; F. A. Faler, spreadman at Albion.

Kansas-Nebraska Natural Gas Co.—30 miles, 6-in., under way, Albion to Neligh, Neb. Jayhawk Const. Co., Inc., F. A. Faler, spreadman at Albion.

Kansas-Nebraska Natural Gas Co., Inc.—60 miles, 8-10-12-in., under way, Grand Island to Albion, Neb.

Kansas-Nebraska Natural Gas Co.—65 miles, 2-8-in., planned, Big Springs field to Ogallala, Neb., and to Ovid, Colo.

Kansas-Nebraska Natural Gas Co., Inc.—39 miles, 4 and 6-in., planned, Neligh to O'Neill, Neb., 54 miles, 4 and 6-in. planned, Neligh to Hartington, Neb. (extension) Completion date 1952.

Kansas Power & Light Co.—27 miles, 20-in., authorized, Pratt, Kans., to Calista compressor station.

Lake Shore Pipe Line Co.—45 miles, 10¾-in., authorized, northwesterly from T.G.T. system near Meadville, Pa., to Ashtabula, Ohio.

Manufacturers Light & Heat Co.—78 miles, 16-in., contracted, Berwindale, Pa., to near Saltsburg, Pa. Britton Construction Co., contractors.

Michigan Gas Storage Co.—94 miles, 8-24-in., authorized, Laingsburg to Mt. Clemens, Mich.

Michigan Gas Utilities Co.—77 miles, authorized, Sturgis, Hillsdale and Coldwater, Michigan. (22.7 miles, Marshall south to Coldwater; 20 miles, Coldwater easterly to Hillsdale; 22.5 miles, Hillsdale to Sturgis; 11 miles, Hillsdale to Jonesville).

MidSouth Gas Co.—340 miles, proposed, Greene, Poinsett, Crittenden, St. Francis, Lee, Phillips, Monroe, Woodruff, and Cross counties, Arkansas.

Montana Power Co.—18 miles, 16-in., proposed, Pakowki Lake area to Canada-Montana border.

Montana Power Co.—52 miles, 16-in., proposed, Canada-Montana border to Cut Bank, Mont.

Mississippi River Fuel Corp.—98 miles, 16 and 18-in., authorized, feeder line from Lincoln Parish, La., to Waskom field, Harrison County, Texas.

Mississippi River Fuel Corp.—40 miles,

PITT CHEM

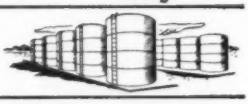
Industry's Most Comprehensive Family of Protective Coatings

Hot Applied Tar Base Coatings

Standard, Modified, Plasticized for pipe lines. Tank Bottom Coating; A.W.W.A., Clay Pipe Inst. Specifications.

Series 100—Cold Applied Tar Base Coatings

All-purpose tar base coatings available for a wide range of applications.

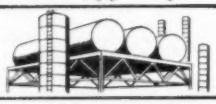


Series 200—Alkyd Basic Coatings

General purpose maintenance finishes for use under normal exposure conditions.

Series 300—Chlorinated Rubber Base Coatings

Chlorinated Rubber and Chlorinated Rubber Alkyd type for use where fumes, condensation or spillage exist.

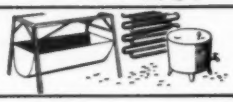


Series 400—Vinyl Base Coatings

For extreme maintenance conditions involving fumes, spillage, or immersion in corrosives.

Series 500—Phenolic Base Coatings

For use where resistance to solvents, organic acids and elevated temperatures is required.



Protective Coatings Division

PITTSBURGH COKE & CHEMICAL CO.

W&D 1484

GRANT BUILDING, PITTSBURGH 19, PA.

OFFICES: NEW YORK • CHICAGO • ST. LOUIS • TULSA • HOUSTON • LOS ANGELES • SAN FRANCISCO

18-in., authorized, Dubach to Perryville, La.

National Utilities Co. of Michigan.—78.7 miles, 20-in., proposed, South Central Michigan. (22 miles from near Marshall south to Coldwater; 20 miles east to Hillsdale; 22 miles southwest to Sturgin; 5 miles from Hillsdale to Jonesville and 6 miles west to Union City.)

Nevada Natural Gas Pipe Line Co.—114 miles, proposed, Topock, Ariz., to Las Vegas, Nev.

New River Gas Co.—50 miles, planned, Summers or Monroe counties, W. Va., to Narrows and Dublin, W. Va.

Niagara Mohawk Power Corp.—40 miles, 10-12-16-in., under way, lateral lines at Utica, N. Y.; 55 miles, 10-in., Fulton to Watertown, N. Y.; Williams-Austin Co., contractor, Howard Bauer, supt.

Northeastern Gas Transmission Co.—511 miles 20-24-in., authorized, New Hampshire, Massachusetts, and Connecticut.

Northeastern Gas Co.—411 miles, proposed, New England towns.

Northern Natural Gas Co.—580 miles, proposed, Kansas, Texas, Oklahoma, and Nebraska loops.

Northern Natural Gas Co.—370 miles 4-26-in., authorized, gathering lines in Hugoton field.

Northern Natural Gas Co.—217 miles, 26-in., under way, Palmyra, Neb., to Skellyville, Tex. G. G. Griffis Const. Co., contractor; field office, Beatrice, Neb.; G. L. Mims, superintendent; E. G. Grisham spreadman.

Northern Natural Gas Co.—210 miles, 26-in., proposed, five loops in Texas-Oklahoma area, two in Kansas, and two in Nebraska.

Northern Natural Gas Co.—181 miles, 4-12-in., contracted, gathering system in Hugoton area. Reese Bros. Const., contractor.

Northern Natural Gas Co.—108 miles, 26-in., under way, Beatrice, Neb., to Mullenville, Kans. G. G. Griffis Const. Co. G. L. Mims, spreadman at Beatrice, Neb. Completion date 12-1-51.

Northern Indiana Fuel & Light Co.—33 in., authorized, Perryville Station, La., to Boeuf River.

Southern Natural Gas Co.—14 miles, 24-in., authorized, Onward Station, Miss., to Big Sunflower River.

Southern Natural Gas Co.—14 miles, 14-in., authorized, Perryville Station, La., to Wilhite Gate.

Southern Natural Gas Co.—375 miles, 24-in., planned. Gwinville, Miss., to Atlanta Ga.

Southern Natural Gas Co.—169 miles, proposed loops, Ouachita Parish, Louisiana, to Augusta, Ga.; 20 miles in Ouachita Parish 33 miles in Ouachita and West Carroll parishes; 7 miles, Sharkey County, Mississippi and 109 miles, 14-in., Bass Junction to Augusta, Ga.

Southern Union Gas Co.—15 miles, 20-in. authorized, Albuquerque main line; 19-83 miles, 8-in., authorized, Kings Mountain to Asheville, N. C., completion date 3-1-53.

Rockland Light & Power Co.—22 miles, 8-in., proposed, Orangetown to Tompkins Cove, N. Y.

Southern California Gas Co.—35 miles, planned, Antelope Valley, California.

Southern California Gas Co. and Southern Counties Gas Co.—36 miles, 6-8-in., contracted, Palmdale to Mojave, Calif. Alex Robertson Co., contractor, E. C. Neal, spreadman at Lancaster, Calif., completion date 11-1-51.

Southern California Gas Co., and Southern Counties Gas Co. of California.—81 miles, 30-in., proposed, Whitewater to Desert Center, Calif.

Southern California Gas Co.—24 miles, 30-in., under way, Inglewood to San Ferdando Valley, California. Alex Robertson Co., contractor. Completion date 11-51.

Southern Natural Gas Co.—21 miles, 24-miles, 8-in., proposed, Edgerton to Auburn Ind.

Northwest Natural Gas Co.—750 miles planned, Washington, Oregon, and Idaho.

Ohio Fuel Gas Co.—22 miles, 16-in. authorized, Dayton, Troy, Piqua, and Sidney Ohio.

Ohio Fuel Gas Co.—23 miles, 16-20-in., authorized, Wellington to Elyria, Ohio; 16 miles, 20-in., authorized, Benton Station, to Crawford Station, completion date 11-15-51; 18 miles, 20-in., Crawford Station, to near Columbus, completion date 12-31-51; 16 miles, 16-in., authorized, Berlin Heights to Sandusky, Ohio, completion date 12-31-51.

Ohio Fuel Gas Co.—74 miles, 3 to 20-in., authorized, Hocking, Knox, and Ashland counties, Ohio.

Ohio Fuel Gas Co.—47 miles, 20-in., authorized, Benton Township, Hocking County, to Columbus, Ohio.

Ohio Fuel Gas Co.—61 miles, authorized, northern and southwestern Ohio.

Oklahoma Natural Gas Co.—16 miles, 8⅝-in., authorized, Shamrock to Cushing, Okla.; 33 miles, 24-in., authorized, Depew to Kellyville, Okla.; 9 miles, 12¾-in., Stroud to Depew, Okla.

Oklahoma Natural Gas Co.—40 miles, 16-in., under way, Ninnekah, Okla., to County Line, Okla.; Trojan Construction Co., contractor.

Oklahoma Natural Gas Co.—26 miles, 12-in., authorized, Ringwood to Enid, Okla. Completion date January 1952.

Oklahoma Natural Gas Co.—40 miles, 3-26-in., authorized, Ringwood field gathering system. Completion date January 1952.

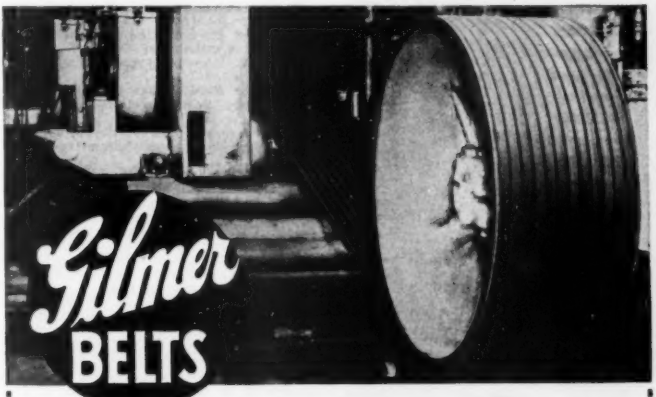
Pacific Gas & Electric Co.—44 miles, 8-in., under way, Salinas to King City, Calif.

Pacific Gas and Electric Co.—141 miles, 14-in. proposed, parallel sections along Topock-Milpitas line.

Pacific Gas & Electric Co.—10 miles, 10-12-in., authorized, Monterey to Fort Ord to Castroville; 12 miles, 16-in., Napa Wye to Shellville; 6 miles, 12-in., Cotati to Santa Rosa, Calif.

Pacific Northwest Pipe Line Co.—400 miles, 22-in., gathering lines on Texas Gulf coast to Pacific Northwest pipe line.

Pacific Northwest Gas Pipe Line Corp.—



for long, hard service on heavy-duty jobs

GILMER MULTIPLE V-BELTS

ALWAYS you can count on Gilmer V-Belts for strong pulling power. In design and construction they're built to stand up under the most rugged demands of oil field service.

Gilmer V-Belts are firm-gripping; straight wall construction assures full contact with sheaves. Their extra strong Rayon pulling cords can handle your heaviest loads.

And the cords are locked in parallel, cushioned in live rubber, and *correctly positioned* to give you cool-running, smooth-flexing, uniform belt performance. Tough multiple jackets withstand the toughest wearing conditions met in oil field service.

You can get Gilmer Multiple V-Belts, standard or special, endless or non-endless, for every drive.

Write for FREE copy of the fact-packed Gilmer V-Belt Guide. And for top-quality transmission, always specify Gilmer V-Belts.

BUY THROUGH YOUR GILMER DISTRIBUTOR

Bovaird Supply Co. Wilson Supply Co. Globe Sales Co.

L. H. GILMER COMPANY

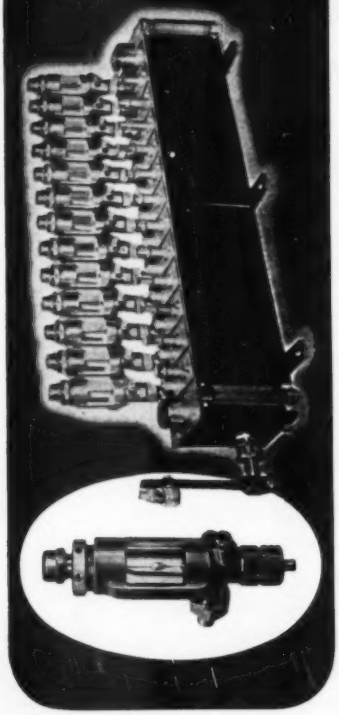
1109 Tacony, Philadelphia 35, Pa.

Division of United States Rubber Company

V-BELTS • FLAT BELTS • HOSE • PACKING • TAPE

new McCORD Tubular "Clearsite" Feed SF LUBRICATOR

The new McCord "SF" Lubricator delivers a predetermined quantity of oil under pressure at regular intervals to cylinders or bearings. A new improved tubular clearsight feed, a McCord development, shows delivery and quantity of oil. It may be cleaned without removing from pump. Other McCord advantages are easy removal of pump units, welded steel tanks, wide variety of drives, and a new graduated oil level gauge providing greater visibility. McCord offers you an outstanding lubricator, further improved to provide better service. Deliveries are prompt.



LUBRICATOR DIVISION
McCORD CORPORATION • Detroit 11, Mich.

4,175 miles, planned, Wharton County, Texas via Oklahoma, Kansas, Fort Collins, Colo. to Portland, Ore., Tacoma and Seattle, Wash.

Panhandle Eastern Pipe Line Co.—70 miles, 24-26-in., under way, looping from Sneed, Tex., to Emporia, Kans.

Panhandle Eastern Pipe Line Co.—174 miles, 30 and 26-in., contracted, Tuscola, Ill., eastward—looping present system; R. A. Conyes, contractor. 44 miles, 26-in., Edgerton, Mich.; Anderson Bros.: 22 miles, 30-in., looping in Tuscola, Ill.; 45 miles, 30-in., looping in Montezuma, Ind.; 63 miles, 30-in., looping in Zionsville, Ind.

Pennsylvania Gas Co.—52 miles, 12-in., between Warren and Erie, Pa. (Sect. 1—17 miles, under way and contracted by Harford Bros. Sect. 2—25 miles.

Peoples Natural Gas Co.—25 miles, proposed, Cambria and Blair counties, Pennsylvania.

Phillips Natural Gas Co.—20 miles, 8-in., under way, Blue Lake to Chocolate Bayou, Tex. 10-51 completion date.

Phillips Petroleum Co.—116 miles, 3-22-in. under way, Sherman and Hansford counties, Texas gas-gathering system; Vaughn & Taylor Construction Co., Inc., Dumas, Tex., J. F. Crawford, spreadman at Texhoma, Okla.

Piedmont Natural Gas Co.—28 miles, 6 in., proposed, North Carolina—laterals from Transcontinental gas system.

Prince George's Gas Corp.—20 miles, 22 in., authorized, between Chillum and Rockville, Md.

Public Service Co. of North Carolina.—33 miles, 10-in., authorized, Burlington to Chapel Hill, N. C., completion date 3-1-52; 16 miles, 8-in., authorized, Chapel Hill to Raleigh, N. C., completion date 7-1-52; 29 miles, 4-in., authorized, Statesville to Kanapolis, N. C., completion date 7-1-52; miles, 8⅝-in., authorized, Clovis to Portales, N. M., completion date 12-51.

Southwest Gas Corp., Ltd.—26 miles, proposed, from P. G. & E. line to Victorville, Calif.

Sunray Oil Corp.—133 miles, 3-30-in., under way, system for Snyder gasoline plant. Vaughan & Taylor Construction Co., contractor. D. D. Vaughn, spreadman.

Tennessee Gas Transmission Co.—98 miles, 30-in., planned, first 150 miles of loops to be laid at Monroe, La., Greenville, Miss., Midland and Portland, Tenn.

Tennessee Gas Transmission Co.—43 miles, planned, looping on Buffalo and New England extensions.

Tennessee Gas Transmission Co.—304 miles, 24-in., proposed, between Mercer, Pa., and Utica, N. Y.; 528 miles, proposed loops; 200 miles, proposed, miscellaneous lateral lines.

Tennessee Gas Transmission Co.—152 miles, 30-in., under way, vicinity of Jones, La., on the north to near Cypress, Tex., on the south; Houston Contracting Co. Four spreads located as follows: North end work at Bastrop, Tex., W. H. Hayes and M. L. Thompson, superintendents; center section at Natchitoches, La., E. C. Norris and R. E. Thornton, superintendents; south end at Conroe, Tex., F. A. Silar, superintendent.

Tennessee Gas Transmission Co.—84 miles 26 and 30-in., loops, contracted, South Texas. Oklahoma Contracting Co., contractor, field office, Falfurrias, Tex., Panama Shiflett, superintendent.

Tennessee Gas Transmission Co.—156 miles 24-in., under way, Hamburg to Onondaga-Madison County line, N. Y.; H. C. Price, Auburn and Warsaw, N. Y., field offices G. A. Reutzel and R. K. Shivel, spreadmen.

Tennessee Gas Transmission Co.—120 miles 24-in., under way, Hamburg to Hudson River; Bechtel Constructors, Inc.; Richfield Springs, N. Y., project office, R. L. Bowman and W. N. Molander, superintendents.

Tennessee Gas Transmission Corp.—419 miles, 26-30-in., authorized, loop line along presently authorized system.

The Texas Co.—27 miles, 8-in., authorized, Ventura to Filmore, Calif.

Texas Eastern Transmission Corp.—791 miles, 30-in., under way, Kosciusko, Miss. to Connellsville, Pa.

Texas Eastern Transmission Corp.—58 miles, 30-in., under way, Ohio River to

Lining up and welding off-shore pipeline.

HOUSTON CONTRACTING COMPANY
General Contractors
OIL • GAS • GASOLINE • WATER PIPE LINES
LAURENCE H. FAVROT R. K. GREGORY GEO. A. PETERKIN
2707 FERNDALE PLACE HOUSTON 6, TEXAS

GENERAL
PIPE LINE
CONTRACTORS
Personal Supervision on Construction of Your
Pipe Lines • Water Lines
Sewer Lines • Excavations
Salt Water Disposals
TROJAN
CONSTRUCTION CO.
INCORPORATED
1416½ N. ROBINSON
OKLA. CITY, OKLA. PH. 2-7696
WAREHOUSE PHONE 6-1430

Vanceburg, Ky. Trojan Construction Co. Inc., contractor. Charles Tillotson, spread man at Winchester, Ky.

Texas Eastern Transmission Corp.—7 miles, 30-in., under way, Cumberland River to Columbia, Ky. Oman Construction Co. contractor. William Smith, superintendent and Floyd Hudnell, spreadman at Columbia, Ky.

Texas Eastern Transmission Corp.—76 miles, 30-in., Columbia, Ky., to Hartsville, Tenn. Oman Const. Co. A. H. Hobson, spreadman at Columbia.

Texas Gas Transmission Corp.—35 miles 12-in., authorized, Slaughters, Ky., to Evansville, Ind.

Texas Gas Transmission Corp.—189 miles 26-in., authorized, Acadia Parish to connection with existing facilities in Morehouse Parish.

Texas Gas Transmission Corp.—195 miles 26-in., proposed, Gulf Coast region to southwestern Louisiana.

Texas Gas Transmission Corp.—425 miles 26-in., authorized, looping from Bastrop, La., to Hardinsburg, Ky.

Texas Gas Transmission Corp.—181 miles 26-in., under way, Bastrop to Eunice, La. Houston Contracting Co. (North spread near Beekman, 65 miles south to Grayson, La., W. H. Hayes, supt.; center spread north side of Red River at Pineville, 60 miles north to Grayson, E. C. Norris, supt.; south spread, south side of Red River, 56 miles south to Tepetate field near Eunice F. A. Silar, supt.).

Texas Gas Transmission Corp.—580 miles 26-in., proposed, Louisiana and Kentucky

Texas-Illinois Natural Gas Pipeline Co.—1,300 miles 30-in., under way, Corpus Christi area to Joliet, Ill.

Texas-Illinois Gas Pipe Line Corp.—340 miles, 30-in., under way; Trinity River to Texarkana; H. C. Price, contractor. C. E. Shivel, spreadman at Carthage; C. R. Ice, spreadman at Nacogdoches.

Texas-Ohio Gas Co.—1,350 miles, 30-in., proposed, Hidalgo County, Texas, through Arkansas, Mississippi, Tennessee, and Kentucky on to Spencer, W. Va.

Union Gas & Electric Co.—35 miles, 8-in. Bloomington to Harris, Ill. O. R. Burden contractor. Floyd Lewis, spreadman at Bloomington, Ill.. Fall completion date.

Union Gas & Electric Co.—33 miles, 8-in., Farmer City to Bloomington, Ill. Contracting & Material Co. A. T. Perry, spreadman at LeRoy, Ill. Completion date 12-15-51.

Union Oil Co. of California.—40 miles, 8-10-in., planned, San Joaquin Valley and Los Angeles Basin.

United Fuel Gas Co.—32 miles, 20-in., under way, Lanham to Broad Run, W. Va. H. L. Gentry Construction Co., contractor Frank Morris, spreadman at Charleston, W. Va.

United Gas Pipe Line Corp.—315 miles 24-30-in., contracted, Agua Dulce to near Goodrich, Tex. Oklahoma Contracting Co., contractor.

United Gas Pipe Line Corp.—53 miles 24-in., authorized, Texas; 93 miles, 20-24-26-in., authorized, Houston, Beaumont, Orange Tex.

United Gas Pipe Line Co.—50 miles, 16 in., authorized, Baldwin County, Alabama southeasterly to Escambia County, Florida

United Gas Pipe Line Co.—100 miles 20-24-26-in., contracted, Near Houma to Franklin, La.; Associated Pipe Line Contractors, Inc.

United Gas Pipe Line Corp.—510 miles 24-26-30-in., contracted, Agua Dulce, Tex. to Monroe, La.; 233 miles, 20-24-26-30-in from Pure Oil Co.'s offshore platform Block 32 Eugene Island area to Jackson, Miss., comp. sta.; 60 miles, 12-16-20-in., from Lafayette comp. sta. and Weeks Island field to Franklin, La., to connect with above mentioned 30-in.; 59 miles, 30-in., Jackson comp. sta., Miss., to Texas Eastern Trans Corp.; 124 miles, Sterlington comp. sta near Monroe, La., to Jackson comp. sta., Miss.; 23 miles, 8-12-16-in., South Louisiana facilities; all contracted by Gulf Southern Contractors, a joint venture including Texas-Louisiana Contractors; Oklahoma Contracting Co.; J. Ray McDermott and Morrison Knudson. Inspection by Brown & Root, Inc

United Gas Pipe Line Co.—30-in., contracted, Gonzales, La., to Kosciusko, Miss River Const. Corp. Completion date 11-51.

United Gas Pipe Line Co.—24-in., contracted, Baxterville, La., to McComb; River Construction Corp. Completion date 11-51.

United Gas Pipe Line Co.—65 miles, 30-in., under way, Gonzales, La., to Kosciusko, Miss. River Const. Corp. Red Tatum, spreadman at Hammond, La. Completion date 11-51.

United Gas Pipe Line Co.—43 miles, 24-in., under way, Baxterville, La., to McComb, Miss. River Const. Corp. Jim Reed, spreadman at Columbia, Miss. Completion date 11-1-51.

United Gas Pipe Line Co.—87 miles, 20-in., under way, State Line to Jackson, Miss. River Const. Corp. Merle Tatum, spreadman at McComb, Miss. Completion date 12-15-51.

U.S.E.D.—18 miles, 8⅝-in., contracted, Norwalk to Long Beach, Calif. J. E. Young Pipeline Contractor, Inc.

Utah Natural Gas Co.—360 miles, 22-in., proposed, San Juan Basin area to Salt Lake Utah.

Virginia Natural Gas Co.—183 miles, Buckingham to Richmond and Portsmouth, Va.

Western Kentucky Gas Co.—2 to 4-in., under way, additions to present system; Modern Welding Co., Inc., contractor.

Western Pipe Lines.—1,200 miles, 22-in., planned, Southern Alberta to Duluth, Minn.

West Texas Gas Co.—27 miles, 10-in., authorized, Lubbock to Abernathy, Tex.

Foreign Crude-Oil Pipe Lines—Planned and Under Way

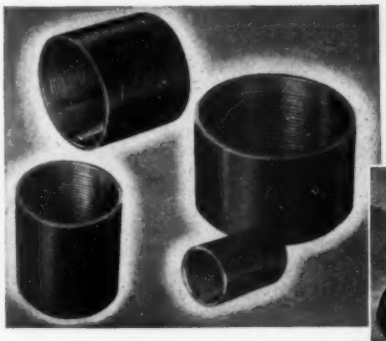
Alberta Pacific Oil Pipe Line Co. (Brokaw, Dixon, McKee).—970 miles, 16-in. proposed, Edmonton south to Kingsgate, B. C., to Washington to Vancouver, B. C.

Cia. de Petroleo Ganso Azul, Ltd.—48 miles, 4-in., planned, Ganso Azul field to Pucalpa on upper Ucayali River, Peru.

Condor S.P.A. (Shell).—80 miles, planned, Genoa to Rho, near Milan, Italy.

ACCURATE THREADING

...Key to the Dependability of HARRISBURG Couplings and Flanges



HARRISBURG Seamless Steel Pipe Couplings are manufactured to A.P.I. and A.I.S.I. specifications.

HARRISBURG Drop-Forged Steel Pipe Flanges are manufactured to A.S.A. standards.

THREAD ACCURACY and constant rigid inspection assure superior strength and endurance in *Harrisburg* Couplings and Flanges. Couplings are threaded on special machines to insure accuracy of form, height, angle, and lead. Flange threads are perfect in height, angle, taper, and gauging.

SEE OUR CATALOG IN THE COMPOSITE CATALOG

Consult our Oil Country Distributors or write Harrisburg for information

HOUSTON	LOS ANGELES	TULSA
Henry H. Paris, Distributor, Inc.	Howard Supply Company	W. C. Norris, Manufacturer, Inc. (Couplings only)

HARRISBURG STEEL CORPORATION

Custom-Built Quality Products in Quantity

98 YEARS IN PENNSYLVANIA'S CAPITAL

Harrisburg 6, Pennsylvania

Direccion General de Yacimientos Petroliferos Fiscales.—409 miles, under way, Plaza Huincul to Bahia Blanca, Argentina.

Independent Pipe Line Co.—721 miles, 16-18-22-in., proposed, Edmonton to Vancouver. Spreads as follows: 185 miles of 22-in.; 391 miles, 20-in.; 95 miles, 16-in.; and 30 miles, 18-in.

Iraq Petroleum Co., Ltd.—556 miles, 30-32-in., under way, Kirkuk, Iraq, to Banias, Syria, 1952; Bechtel-Kirkuk, contractor.

Iraq Petroleum Co., Ltd.—72 miles, 12¾-in., Zubair to Fao. Arabian Bechtel Co., contractor. Completion date 12-51.

Middle East Pipelines, Ltd.—800 miles, 34-in., planned, Iran to a Levantine port.

Petroleos Mexicanos.—145 miles, 12-in., considered, 18 de Marzo field via Reynosa to Monterrey, Mexico.

Petroleos Mexicanos.—100 miles, planned, Isthmus of Tehuantepec, Jose Colomo to El Plan field, Minatitlan.

Shell Caribbean Petroleum Co.—160 miles, 30-in., under way; Palmarejo to terminals in the Paraguana Peninsula (Cardon and Las Piedras, Venezuela), 4-52. Land sections contracted by Williams Brothers, de Venezuela, S. A., Charles P. Williams, manager, Marvin E. Jones, superintendent. Water crossings contracted by Mahoney Contracting Co.

Texas Petroleum Co.—60 miles, 4-6-in., under way, Pto. Nino to La Dorada.

Trans-Mountain Oil Pipe Line Co.—715 miles, proposed, Edmonton, Alta., to Vancouver, B. C. Canadian Bechtel, Ltd., engineers.

Winnipeg Pipe Line Co., Ltd.—75 miles, 10-in., under way, Gretna to Winnipeg, Manitoba; Sparling-Fowler Co., Ltd.

Foreign Products Pipe Lines—Planned and Under Way

Colombia Ministry of Petroleum.—90 miles, 6-in., planned, Puerto Berrio to La Dorada, Colombia.

Colombia Ministry of Petroleum.—113 miles, 6-in., contracted, Puerto Berrio to Acededo near Medellin, Colombia. Carolina Construction Co.

Colombian Ministry of Petroleum.—70 miles, 4-in., planned, Buena Ventura to Cali, Colombia.

Empresa de Ferrocarriles Ecuatorianos.—90 miles, 4-in., under way, Guayaquil to Palmira, Ecuador. J. A. Jones, contractor; C. R. C. Engineering Co., engineers.

Estrada de Ferro Santos a Jundiai.—33 miles, 18-in., under way, Santos to Sao Paulo, Brazil (fuel oil line); Techint, contractor. Completion date 12-51.

Governments of Southern Rhodesia and Portuguese East Africa.—200 miles, considered, Beria, Portuguese Mozambique to Umtali, Southern Rhodesia.

Imperial Oil Co., Ltd.—195 miles, 10-12-in., planned, Sarnia via London, Hamilton to Toronto, Ont., Canada. Comstock Midwestern, Ltd., contractor.

Petrocongo (Sub. Cie. Financiere Belge des Petroles, S. A.).—225 miles, considered, Ango-Ango to Leopoldville, Belgian Congo.

Petroleos Mexicanos.—155 miles, 10-in., under way, Minatitlan to Salina Cruz, Mexico.

Societe des Transports Petroliers par Pipe Line.—140 miles, 10-in., under way, Le Havre to Paris, France. Entrepose, contractor. Completion date 1952.

State of Cundinamarca, Colombia.—120 miles, 6-in., Puerto Salgar, to Bogota, Colombia; Williams Brothers Corp., David Louthen, manager, Bogota.

Trans-Northern Pipe Line Co.—400 miles, proposed, Hamilton, Ont., to Toronto, Ont., to Montreal, Que., Canada.

Foreign Natural-Gas Pipe Lines—Planned and Under Way

Azienda Generale Italiana Petroli.—110 miles, 12-14-16-in., planned, Cortemaggiore to Genoa.

Azienda Generale Italiana Petroli.—110 miles, planned, Cortemaggiore to Bologna.

Azienda Generai Italiana Petroli.—165 miles, 14-16-in., under way, Cortemaggiore to Torino. Completion date 1951.

Canadian Western Natural Gas Co., Ltd.—27 miles, 8-in., under way, Jumping Pound to Exshaw, Alberta. Company crews. Completion date 10-51; 22 miles, 6-in., under way, Exshaw to Banff. Company crews. Completion date 10-51.

Canadian Delhi Oil Co. (Subsidiary Delhi Oil Co.).—2,132 miles, proposed, Alberta, Toronto, Montreal.

Direccion General del Gas del Estado.—310 miles, 8-in., under way, Plaza Huincul to Neuquen, Argentina, to the vicinity of General Conesa, Argentina.

Northwest Natural Gas Co.—950 miles, 24-in., planned, Alberta fields to Vancouver, B. C., Seattle, Wash., and Portland, Ore.

Northwestern Utilities, Ltd.—35 miles, 16-in., authorized, Viking to Shonts, Alberta.

Petroleos Mexicanos.—205 miles, 16-in., considered, Monterrey to Torreon, Mexico.

Petroleos Mexicanos.—260 miles, 20-in., under way, Monterrey to Tampico and Poza Rica, Mexico.

Petroleos Mexicanos, Mexican Gas Co., and Industrial Gas Co.—600 miles, planned, Reynosa, Tamaulipas, to Tampico-Poza Rica, Mexico.

Trans-Canada Pipe Lines, Ltd.—Proposed, Alberta to Toronto and Montreal.

Venezuela Atlantic Transmission Corp.—195 miles, 10-12-16-in., under way, El Placer near Las Mercedes, State of Guarico to Caracas, La Guaira, Maracay, and Valencia. Contracted by Williams Brothers, de Venezuela, S. A., B. E. Barnes, manager.

Westcoast Transmission Co., Ltd.—1,110 miles, 24-in., planned, Dawson Creek, B. C., through Pine Pass and Fraser River Valley to Kamloops, Princeton, and Vancouver to Portland. Ford, Bacon, and Davis, engineers.

Westcoast Transmission Co., Ltd.—280 miles, 20-in., planned, Pincher Creek to Montana on to Spokane, Wash. Ford, Bacon, and Davis, engineers.

Western Pipe Lines.—1,200 miles, 22-in., planned, southern Alberta, Winnipeg, to Duluth, Minn.

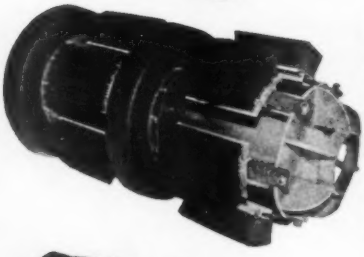
THE PIG WITH THE POKE — CLEANS PIPE LINES

MORE BARRELS PER DOLLAR . . .

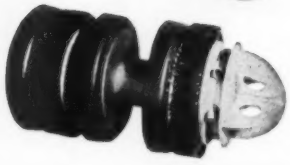
THROUGH OIL PIPE LINES

CLEANED BY WILLIAMSON PIGS

Type JR Pig 2" to 5" sizes. Economical and Rugged.



Type GP-4 Pig 16" to 30" sizes. Similar design for 10" to 14" sizes. Brushes expanded by arched springs. Brush & cup service life up to 1,000 miles.



Type RC-50 Pig 8" to 14" sizes. 6" size, similar, type SC-50. Jet-rotation feature distributes wear of brushes and cups.

REPRESENTATIVES

H. E. Davis, Los Angeles 15, Calif. — James S. Kone Co., Amarillo, Texas — Keyes Tank Co., Provo, Utah — Keyes Tank & Supply Co., Casper, Wyoming

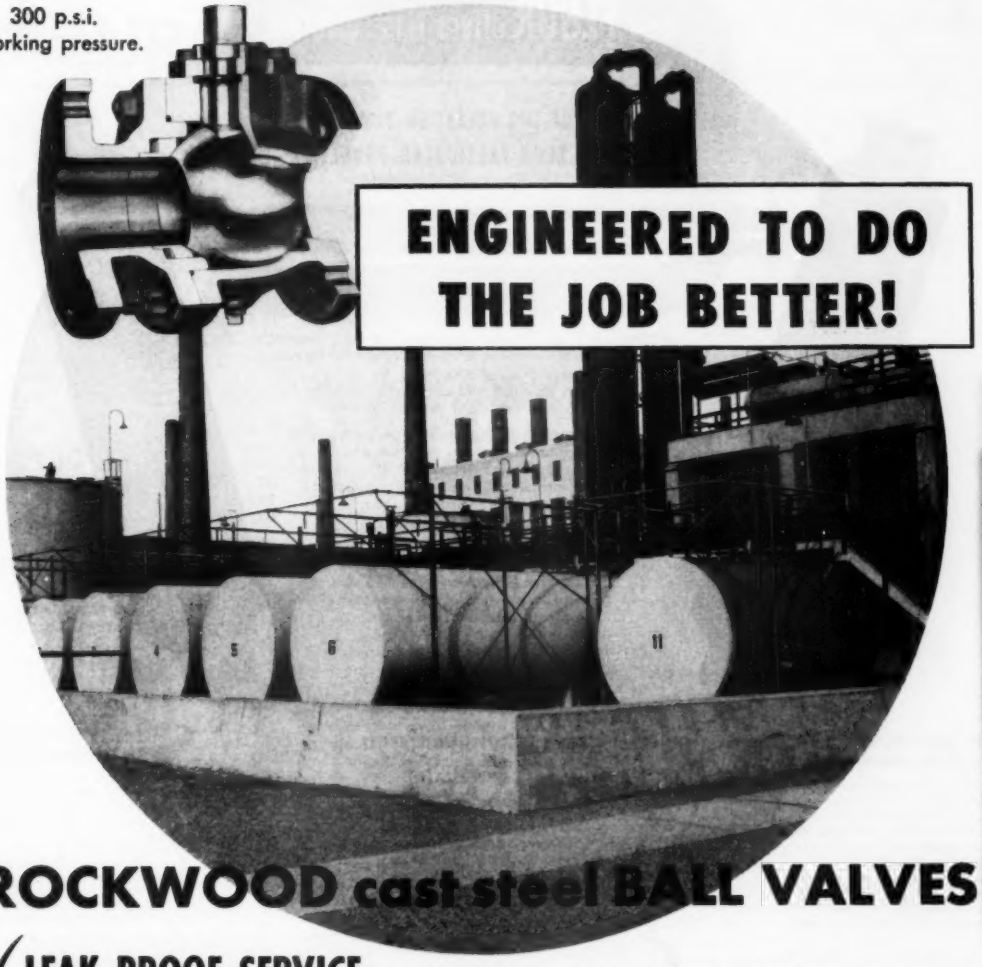
Canadian Equipment Sales & Service Co., Ltd., Edmonton, Calgary, Toronto, Canada

WRITE FOR COMPLETE INFORMATION

T. D. Williamson, Inc.

TULSA 9, OKLAHOMA

300 p.s.i.
working pressure.



ENGINEERED TO DO THE JOB BETTER!

ROCKWOOD cast steel BALL VALVES

- ✓ LEAK PROOF SERVICE
- ✓ FULL ROUND FLOW
- ✓ QUICK OPENING and CLOSING
- ✓ NO MAINTENANCE

These remarkable Rockwood Cast-Steel Ball Valves are engineered to withstand rugged service in refineries, chemical, food, paper, textile and other processing plants. They are more dependable and will operate perfectly over and over again with no maintenance. Full round flow area allows fluids to pass thru valve without creating turbulence — friction loss is reduced to a minimum. Resilient synthetic rubber seat against hard chromium plated floating ball forms a tight seal — stays tight! Quarter turn quickly and easily opens and closes valve under pressure. Valves can be installed in any position.

Remember, Rockwood Cast-Steel Ball Valves are Engineered for dependability — designed and built for longer trouble-free service. Call your nearest distributor or write direct to Rockwood Sprinkler Company for complete information and prices. Rockwood Valves are available in Cast-Steel in 3" & 4" pipe sizes — in bronze ½" to 2" pipe sizes.

Approved by Underwriters' Laboratories Inc.

Distributors in all principal cities.

ROCKWOOD
SPRINKLER COMPANY
104 HARLOW STREET
WORCESTER 5, MASS.

ROCKWOOD

only FLUOR offers this selection

A CHOICE OF TWO PULSATION DAMPENERS TO SOLVE YOUR PARTICULAR PROBLEM!

A FUNDAMENTAL PULSATION DAMPENER

A HIGHER FREQUENCY PULSATION DAMPENER

In 1943, The Fluor Corporation pioneered the development of pulsation dampeners. The first U. S. Patent covering pulsation dampeners designed specifically for the removal of gas stream pulsation and subsequent vibration in compressor piping was issued to Fluor in 1946.

Continued research in gas pulsation and its associated problems has established that pulsation, and its intricate secondary vibration, can be attributed to both fundamental and high frequency pulsations *—or to high frequency components alone.*

Whichever of these destructive conditions exists in your plant, Fluor offers a dampener engineered to fit the requirements of the specific problem. Fluor—and only Fluor—offers such a complete range of pulsation dampeners. For this reason you can be assured of an unbiased recommendation on the best type dampener for your *particular* requirements.

THE FLUOR FUNDAMENTAL PULSATION DAMPENER

This type dampener smooths out all pulsations in the gas stream to the extent of at least 85%. All harmonics originally set up in each pulse cycle are automatically reduced or eliminated. This dampener is the guaranteed answer in plants where structural vibration and metering difficulties are encountered irrespective of pulsation frequency.

MAKE YOUR OWN PRELIMINARY SURVEY

In many cases you can make your own preliminary survey to determine roughly if your pipe vibration is caused by pulsations. Write The Fluor Corporation, Ltd., Los Angeles 22, California, indicating layout of compressor house piping and operating pressures. A procedure will be mailed to you promptly. No obligation.

THE FLUOR HIGHER FREQUENCY PULSATION DAMPENER

This dampener removes objectionable pulsation frequencies encountered above the fundamental. In many instances, it has been found that metering difficulties and vibration of compressor piping and nearby vessels have been caused by the higher frequency components alone. Available in both manifold and in-line types, this dampener is competitive in cost with muffler or snubber type devices.

available for your files...

TECHNICAL PAPERS *on the subject of* GAS PULSATION

BY ENGINEERS OF THE FLUOR CORPORATION

"Pulsation Phenomena in Gas Compression Systems"
By I. C. Bechtold, *Director of Research and Development*

Abstract: *Pulsation phenomena in gas transmission lines leading to and from gas compressor stations are described along with a description of the mechanical vibration induced from the pulsative flow.*

"Effect of Pulsation on Gas Measurement"
By C. P. Yates, *Research Engineer*

Abstract: *This paper discusses the effect of pulsative flow on the accuracy of measuring gas flow rate by orifice meters. Data are presented showing the relationship between magnitude and nature of the pulse and the resultant readings recorded by the measuring instrument.*

"Mechanical Vibration of Piping Induced by Gas-Pressure Pulsations"
By R. C. Baird, *Research Engineer*, and I. C. Bechtold, *Director of Research and Development*

Abstract: *The generation and nature of gas-pressure pulses from reciprocating compressor action are described, together with the propagation of such pulses through pipe lines. The means whereby pulse energy is converted to mechanical vibration is discussed by the aid of analogous mechanical, acoustical, and electrical oscillatory systems. The economic importance of minimizing vibration in compressor and compressor-dependent installations is indicated.*

Send for your free copies by post card or letter

FLUOR

BE SURE WITH FLUOR

DESIGNERS AND CONSTRUCTORS of Refinery, Natural Gas and Chemical Processing Plants. MANUFACTURERS of Mufflers, Pulsation Dampeners, Gas Cleaners, Cooling Towers and Fin-Fan Units.

THE FLUOR CORPORATION, LTD., 2500 S. Atlantic Blvd., Los Angeles 22, Calif. Offices in principal cities in the United States
REPRESENTED IN THE STERLING AREAS BY: Head Wrightson Processes Ltd., Teesdale House, Baltic Street, London, E.C.1., England

NATURAL GAS

Michigan Company Acquires Riverside Field for Storage

WASHINGTON.—Michigan Gas Storage Co., of Jackson, Mich., has received the green light from the Federal Power Commission to acquire Riverside gas field in Michigan for operation as an underground-storage area.

The company will acquire an existing 10-mile line and other facilities owned by Consumers Power Co., also of Jackson.

Michigan Gas Storage will build about 78 miles of 16, 22, and 24-in. lines from Laingsburg Junction to a point near Pontiac and Mount Clemens; 17 miles of lateral lines into Consumer's southeast division in southeastern Michigan; 30 miles of 26-in. loop between Laingsburg and Mount Pleasant Junction; and an additional 7,400 hp. in compressor capacity at its Muskegon River station.

The facilities will be used for receipt, transportation, and storage of gas received from Panhandle Eastern Pipe Line Co. Gas will be delivered to Consumers. Total estimated cost of construction is $10,866,000.

Texas' Marketed Production 322 Million M.c.f. in August

AUSTIN.—Marketed production of natural gas in Texas during August climbed to 321,982,170 M.c.f., an increase of almost 15,000,000 cu. ft. over production in July and 23 per cent over August 1950, according to the Texas Railroad Commission.

Total gas produced was 394,845,466 M.c.f., up more than 16 per cent over the same month last year. Transmission lines took more than 232 billion cubic feet or 58.84 per cent of the total gas produced, an increase of more than 30 per cent over the August 1950 take. More than 36 per cent of the total was exported to other states.

A 65 per cent increase occurred in venting and line loss, a total of more than 5 billion cubic feet. Much of this was attributed to higher allowables set by the commission in response to the federal Government's call for increased production due to the Iranian shutdown. West Texas gasoline plants and gathering lines were unable to take care of the accompanying boost in gas production. Reduced oil allowables for November are expected to cut waste.

Tennessee Gas Drops Plan To Export Gas to Canada

WASHINGTON.—Tennessee Gas Transmission Co. has abandoned for the present its plans to increase capacity of its pipe-line system by 115,000,000 cu. ft. of natural gas per day for ultimate delivery to markets in Ontario, Canada.

Tennessee said it is not prepared immediately to submit exhibits required by the Federal Power Commission, and asked that the withdrawal of its application be authorized without prejudice to future filing of another application.

The proposed construction program was estimated to cost $47,403,000. It included a line from Buffalo, N. Y., to the United States-Canadian border near Niagara Falls. Gas would have been delivered to Niagara Gas Transmission, Ltd., a newly formed Ontario corporation.

Eugene Island Gas Moving

CHICAGO.—Pure Oil Co. has inaugurated gas deliveries to United Gas Pipe Line Co. from its Eugene Island field, 10 miles offshore from St. Mary's Parish, Louisiana, in the Gulf of Mexico.

United is taking the gas at a platform near the producing wells and transporting it through submarine lines to shore thence to markets from southern Louisiana as far north as New England.

New development work in the Eugene Island area has been halted by Pure due to the current impasse over federal or state control of the tidelands, according to Comer Plummer, Pure president.

ULTIMATE DISPOSITION OF ALL GAS PRODUCED IN TEXAS
(Source: Texas Railroad Commission)

	M.c.f.	Per cent of total	Per cent of increase over August 1950
Extraction loss—plants*	13,511,617	3.42	12.98
Plant fuel and lease use	29,477,554	7.47	3.63
Gas lift	14,649,700	3.71	13.62
Pressure maintenance and repressuring	25,869,641	6.55	—7.56
Transmission lines	232,336,945	58.84	30.37
Cycled	46,993,655	11.90	—6.29
Carbon black	26,961,136	6.83	1.92
Vented and line loss	5,045,218	1.28	64.93
Total	394,845,466		16.42
Net total for market	321,982,170		23.36

*Extraction loss is shrinkage in gas volume due to removal of liquefiable hydrocarbons.

Gas O.K.'d for Carbon Black

AUSTIN.—Texas Railroad Commission last week granted permission to United Carbon Co. to manufacture carbon black from gas produced in Fulton Beach, West Fulton Beach, Copano Bay, and Salt Lake fields without prior extraction of the natural-gasoline content. The special permission was granted on the basis that extraction would be unprofitable. The gas will be used at United's carbon black plant between Rockport and Aransas Pass.

Natural Gasoline

NPC Says L.P.G. Supplies Up 15 Per Cent This Year

WASHINGTON.—Supplies of liquefied petroleum gas will be up more than 15 per cent in January of next year over January 1950, and transportation facilities will be able to take care of the increase, according to National Petroleum Council predictions.

NPC's Committee on L.P.G. Availability, Transportation, and Materials Requirements estimates that 380,386,269 gal. will be available monthly beginning the first of the year.

Transportation is expected to be sufficient, since tank-car construction has kept pace with the increase in L.P.G. production, NPC said.

Up to October of this year, 1,270 tank cars have been built which are capable of moving about 20,320,000 gal. of increased output. Another 1,071 are scheduled for completion this year which will move another 17,136,000 gal. The committee estimated that about 50 per cent of L.P.G. produced is consumed where it is produced or is moved by other forms of transportation. On this basis, total new transport capacity of 37,456,000 gal. should be able to handle the total increased L.P.G. availability easily.

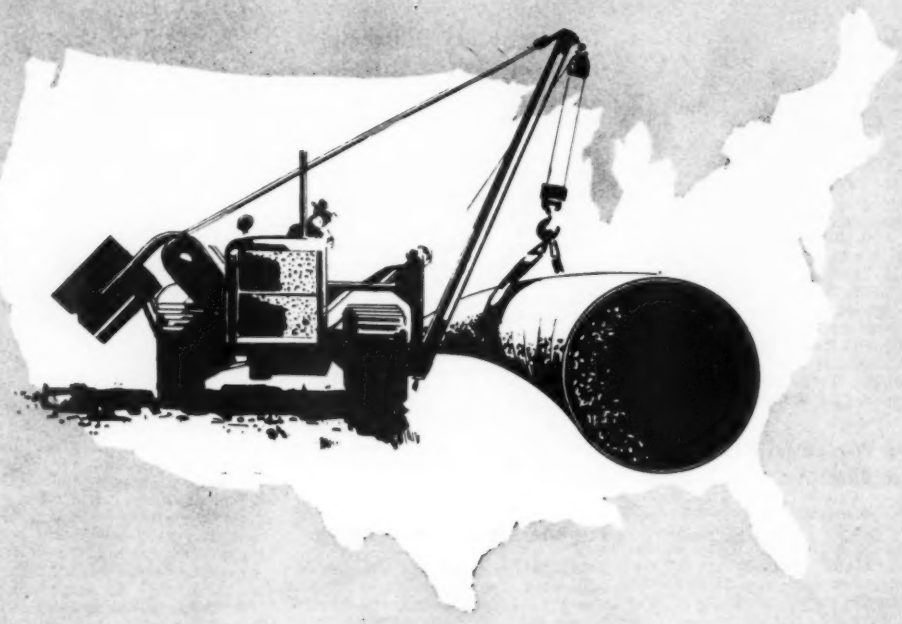
Phillips Buys Half Interest In Plymouth's Benedum Plant

BARTLESVILLE, Okla.—Phillips Petroleum Co. has bought an undivided half interest in a gas-processing plant in Benedum field, Upton County, Texas, from Plymouth Oil Co.

Phillips has contracted to purchase the liquid-gas products manufactured by Plymouth and to build a pipe line to the plant, according to W. S. Hallanan, Plymouth president.

Hallanan said the plant has a processing capacity of 100,000,000 cu. ft. of gas per day. It now processes gas from Plymouth's deep wells in Benedum field and the Spraberry area. Phillips has considerable Spraberry production near the plant.

OUT WHERE THE GOING'S TOUGH



OIL LINES
RIVER CROSSINGS
PRODUCTS PIPELINES
GAS PIPELINE CONSTRUCTION

R. H. Fulton & COMPANY

CONTRACTORS

PHONE 5231 LUBBOCK, TEXAS P.O. BOX 1526

PIPE LINES

New Louisiana Line

Texas Gas' project to remedy supply shortage

WASHINGTON.—Texas Gas Transmission Corp.'s 189-mile 26-in. natural-gas line from Acadia Parish, Louisiana, to a connection with company facilities in Morehouse Parish has been approved by Federal Power Commission.

The new $14,000,000 line will remedy the present gas-supply deficiency on the Texas Gas system which now has a capacity of about 705,000,000 cu. ft. per day, while available supplies total only 652,000,000 cu. ft.

Also o.k.'d by FPC was the company's application to build a metering and regulating station for sale of up to 6,000,000 cu. ft. of gas per day on an interruptible basis to Mathieson Hydrocarbon Chemical Corp.'s new plant at Brandenburg, Ky.

Facilities rejected.—The commission rejected the company's plans to build about 405 miles of loop line on sections of its system between Bastrop, La., and Hardinsburg, Ky., plus 17,260 hp. in compressor capacity at existing stations and 3,960 hp. at a new station near Shreveport. The denial said Texas Gas failed to show adequate supplies of gas.

The commission also refused the company's application to sell gas to Tennessee Valley Authority and applications by Louisville Gas & Electric Co., Mississippi Power & Light Co., and Cincinnati Gas & Electric Co. for supplies of gas from Texas Gas.

The authorized 189-mile line will connect at its southern terminus with facilities of Texas Northern Gas Corp. and Louisiana Natural Gas Corp., both subsidiaries of Texas Gas. They will buy gas in South Louisiana fields for delivery to the parent firm. The FPC consent was conditioned to require both subsidiaries to file with the commission for authorization of their required new facilities.

FPC's refusal to o.k. part of the proposed new facilities was without prejudice.

Failures Reduced

FPC tabulates 1,712 gas line mishaps in 10 years

WASHINGTON.—A total of 1,712 pipe-line failures have been experienced by 28 major gas-transmission companies over a 10-year period, according to figures just compiled by the Federal Power Commission.

The information was obtained through a questionnaire sent to the companies for use in congressional studies of legislation providing for the establishment of a safety code for operation of natural-gas pipe lines. The measure has been introduced by Rep. John W. Heselton of Massachusetts and is being supported by the FPC.

The failures reported to the commission were divided about evenly between those occurring in operation of lines and those occurring during testing, 848 in operation and 864 during testing.

The commission pointed out that for several reasons the figures cannot be taken at face value. Of the 864 failures during testing, for example, 661 were experienced by the company which bought the Big Inch oil lines without testing the pipe for gas transmission and occurred when, after nu-

NEW BOOSTER.—Shown above is Shamrock Oil & Gas Corp.'s new semiautomatic booster station in Hutchinson County, Texas. Station layout here is typical of others in the company's system. Some of the booster installations employ reciprocating compressors while others are equipped with rotary-type units. Shamrock owns an extensive casing-head gas-gathering system in this area.

PERRAULT

GLASS PIPE WRAP

★ PIPELINE FELT

★ PIPELINE KRAFT WRAP

★ ROCK SHIELD

"Everything for the Pipeliner"

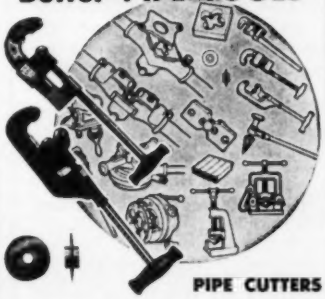
PERRAULT Brothers

1130 NO. BOSTON, TULSA, OKLA. • 5-1103

Export Office:
30 ROCKEFELLER PLAZA
NEW YORK, N. Y.
CIRCLE 6-6260

ARMSTRONG BROS.

Better PIPE TOOLS



PIPE CUTTERS

"ARMSTRONG BROS." Three Wheel and Standard wheel and roller Pipe Cutters are quality cutters throughout . . . built to give years of good service.

"ARMSTRONG BROS." drop forged Pipe Cutters are built for lifetime service with 1-piece drop forged steel heat treated body and a replaceable hardened steel nut to take up the wear and thrust of handle screw. Used either as 1-wheel (with 2 rollers) or 3-wheel (for close quarters).

"ARMSTRONG BROS." Knife Blade Cutter Wheels are machined from special alloy tool steel properly heat treated. They cut rapidly and easily, hold their keen edge.

Write for Catalog

ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"

5204 W. ARMSTRONG AVE. • CHICAGO 30, ILL.

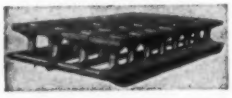
MOLE
Pipeline
Cleaner

For BETTER cleaning of
CRUDE LINES
PRODUCT LINES
NATURAL GAS LINES

FOR DETAILS WRITE

Pipeline Cleaners Co.
Fort Madison, Iowa

Need A HOTTER Flame?



Get a Hard-Firing INFERNO Medium - Pressure Gas Burner

Inferno Medium-Pressure gas burners are designed to operate at peak efficiency where hard-firing and rough usage are the rule. Burner operates on gas pressures from 10 to 20 pounds, produces an intense blue flame. Bulletin 13-D gives complete specifications and prices. Sold through supply stores.

The **INFERNO** co.
Box 1138A
115 RICOU St.
SHREVEPORT, LA.

merous failures, the company undertook a test of the whole system.

Weld failures.—More than half of all failures occurred in welds. Of these failures, 19 were in acetylene welds made in the field, 117 were in electric welds made in the field, and 818 (including the 661 in the Big Inch system) were in shop welds made in pipe fabrication.

There were 98 failures due to blowout and 183 from pullout of couplings, but these accidents were almost entirely in lines laid before the present widespread utilization of electric welding.

The report showed 27 failures caused by road machinery and 73 caused by other machinery.

Failures at river crossings totaled 88, 63 caused by washouts.

Pipe failures numbered 243, of which 113 were due to corrosion, 11 to damage, 68 to splits, and 51 to bends. There were 23 failures in auxiliary equipment and a like number which could not be placed in any of the foregoing categories.

Merely show causes.—The commission emphasized that the figures do nothing more than show some of the causes of failures and the safety problems which must be considered in the design of gas-transmission facilities.

Texas Pipe Line to Build New 195-Mile Crude Line

HOUSTON.—Texas Pipe Line Co. has announced that it will expand and consolidate its crude pipe-line system from Wichita Falls to East Houston, Tex., as soon as approval can be obtained from the Petroleum Administration for Defense.

R. B. McLaughlin, president, said the company would award a contract within 30 days of PAD authorization for construction of a 195-mile, 16-in. line between Corsicana, Tex., and Houston.

In addition, more tankage will be built at Wichita Falls, and modern pump stations erected at Chico and Corsicana. Completion is expected by June 1, 1952.

The company's existing 8 and 10-in. lines between Corsicana and Humble, Tex., will be taken up and reconditioned for use in other company projects.

United Operating New Gas Line to New Orleans Area

NEW ORLEANS.—United Gas Pipeline Co. has placed in operation its new 93-mile, 16-in. gas line from Grand Bay, Venice, West Bay, and Quarantine Bay fields across the spongy Mississippi River Delta to the New Orleans industrial area.

The main trunk of the $14,500,000 project proceeds from the mouth of

Proved Performance

Pipe Line River Crossings

- River Construction
- Hydraulic Dredging

Complete River Equipment

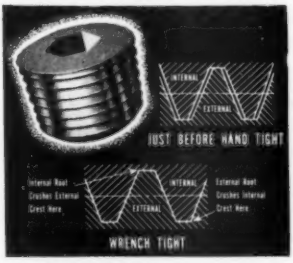
18 in. Hydraulic Dredges

Call FRanklin 5764

MISSOURI DREDGING CO.
1505 Continental Building
St. Louis 8, Missouri

UNBRAKO

DRYSEAL
THREAD
PRESSURE PLUG

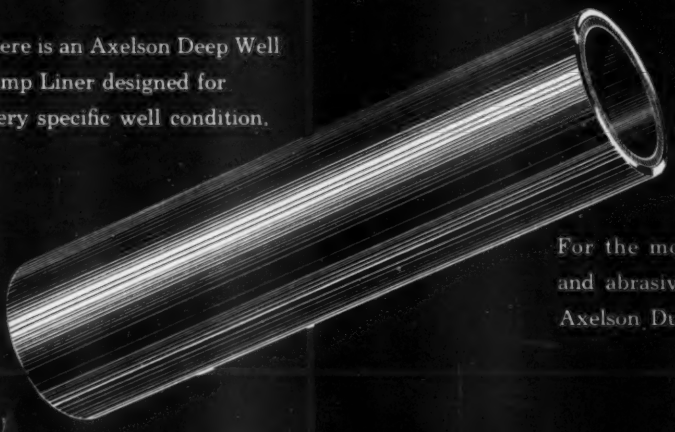


SEALS TIGHT
WITHOUT COMPOUND

Unique thread design of UNBRAKO "DRYSEAL" Pressure Plugs provides positive sealing at both major and minor diameters of threads, preventing spiral leakage, even under extreme pressures. Full range of sizes from 1/16" to 1¼" N.P.T.F. Write for Bulletin 675.

—SPS—
STANDARD PRESSED STEEL CO.
JENKINTOWN 25, PENNSYLVANIA

There is an Axelson Deep Well Pump Liner designed for every specific well condition.



THERE IS NO ECONOMICAL SUBSTITUTE FOR QUALITY

MEMBER PETROLEUM EQUIPMENT SUPPLIERS ASSOCIATION

For the most severe corrosive and abrasive conditions, specify Axelson Duax Liners.

AXELSON

First Choice

ASK AN AXELSON EXPERT

AXELSON MANUFACTURING CO. • PLANTS—Los Angeles 58; St. Louis 16. • OFFICES—New York City 7; Tulsa 1; Buenos Aires, Argentina; Caracas, Venezuela. • DISTRIBUTORS—Jones & Laughlin Supply Co.; Great Northern Tool & Supply Co.; Industrial Agencies, Ltd., San Fernando, Trinidad, B.W.I.; Industrias Waldrip & Campbell, Barcelona and Maracaibo, Venezuela; Dominion Oil Field Supply Co., Ltd., Calgary, Canada; South American Supply Co., Avenida Tacna 592, Lima, Peru.

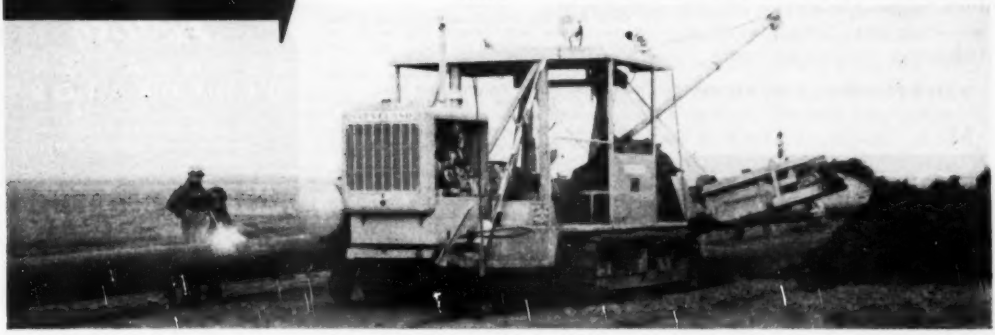
longer work life

lower maintenance

CLEVELANDS longer work life, as proved by the many contractors who still have early-model CLEVELANDS in daily use, cuts overhead and replacement costs on your heavy equipment. CLEVELANDS famous ruggedness and dependability under the roughest digging conditions save on maintenance expense, cut down-time for repairs that can tie up your whole spread.

CLEVELANDS

See your local distributor today for the full facts and figures on dependable CLEVELAND performance tailored to pipeline industry requirements. The Cleveland Trencher Company, 20100 St. Clair Avenue, Cleveland 17, Ohio.



PIPE CUTTING AND BEVELING

Crose pipe cutting and beveling machine for fast true cutting and beveling of pipe. Available in six sizes for 4″ to 36″ pipe. All machines are built of high strength, light weight aluminum alloys. The continuous ring which goes around the pipe is hinged so that these machines may be installed as easily from the side of the pipe as from the end. Machines for 16″ pipe and above have "Out-of-Round" attachment as standard equipment.

WRITE FOR BULLETIN BM-1001

M. J.
CROSE
MANUFACTURING CO., INC.
2715 Dawson Road Tulsa, Okla.

the Mississippi just west of the river's ship-channel entrance, across the river at Venice, La., and north up past Point La Hache and Delacroix to Chalmette, La. The right-of-way frequently is in open water.

Contractor, Brown & Root, Inc., Houston, employed nearly every known method of pipe laying during construction. Operations included ordinary dry-land techniques, laying where terrain was so spongy that only light-weight draglines could be employed, dredging out channels in order to employ a "pole-vaulting" technique, and contending with floating islands *(The Oil and Gas Journal, August 16, pages 94 and 99).*

N.C.U.R. Urges Revision Of Petroleum-Radio Rules

WASHINGTON.—Revision of rules to permit the use of petroleum-radio frequencies by power-service stations operated along natural-gas pipe lines if the coordinated usage is essential to the operation of the natural-gas-transmission system has been asked of the Federal Communications Commission.

A petition filed with FCC by the National Committee for Utilities Radio points out that the proposed rule would be identical with one now in the petroleum-radio regulations allowing the use of power frequencies in a reverse situation. Under that rule, if a showing is made that the natural-gas pipe-line operation is an integral part of a natural-gas-transmission system licensed in the petroleum - radio service, the power licensee may use the same frequency as the petroleum station.

Construction permits for 16 base stations, 134 mobile units, 1 control station and 4 relay stations have been issued by the commission. They include:

Sohio Petroleum Co.: 2 base stations near Abilene, Tex.; 35 mobile units operating on 33.30 mc.; and a control and relay station on either 72.58 or 75.46 mc., also in the Abilene area.

Humble Oil & Refining Co.: Base station near Ramondville, Tex., on 48.86 mc.

United Gas Pipe Line Co.: Base station near Beaumont, Tex., on 48.78 mc.

Interstate Petroleum Communications, Inc.; Base station at temporary locations in the Texas and Louisiana Gulf Coast areas on 2292 kc.

Gulf Refining Co.: 2 base stations in the Romero Pass and Grand Bay areas of Plaquemines Parish, Louisiana, on 49.02 mc.

United Gas Pipe Line Co.: 6 base stations near Agua Dulce, Refugio, and Edna, Tex., Livingston, La., and Jayess and Kosciuski, Miss., and 75 mobile units, all on 48.78 mc.

Magnolia Petroleum Co.: Base station at temporary locations in the Louisiana Gulf Coast waters on 49.18 mc.

Panhandle Eastern Pipe Line Co.: Base station near Mexico, Mo., on 48.70 mc.

Michigan-Wisconsin Pipe Line Co.: 3 operational fixed relay stations near Hatfield, Mo., on 1860, 1920, and 1980 kc.

Socony-Vacuum Oil Co.: 5 mobile units in the company's plant area at Franklin, Pa., on 158.31 mc.

Kerr-McGee Oil Industries: Base station near Duncan, Okla., and 10 additional mobile units, all on 48.94 mc.

S. E. HUEY & CO.
ENGINEERS & SURVEYORS
OUACHITA BANK BLDG.
MONROE, LA.

SURVEYING & MAPPING

PIPE LINE SURVEYS

DESIGNED AND PROVEN
BY PIPELINE MEN

ALL SIZES 6" to 30"

EXPANDS FOR CONSTANT PRESSURE ON ALL SIDES. COMPENSATES FOR BRUSH WEAR.
FLEXIBLE TO ELIMINATE STOPPAGE ON BENDS, DROPS, ETC.
EFFICIENT CLEANING PAYS OFF IN INCREASED GAS VOLUME.

CLEANER PIPELINES CO.
1900 ARMOUR RD. NO. K. C. 16, MO.

TO CHANGE YOUR ADDRESS

IT'S BEST . . .
to send your old address clipped from the Journal mailing envelope along with your new location.

ADVANCE NOTICE . . .
10 days before you move, and we guarantee you week-to-week undelayed service.

WRITE . . .

Circulation Department
THE OIL AND GAS JOURNAL
Box 1260 Tulsa 1, Okla.

EXCEL-SO
SEPARATORS
DEHYDRATORS
are designed to remove free and emulsified water from petroleum products at any capacity or code construction.
WARNER LEWIS
COMPANY
P. O. BOX 3096-A • TULSA, OKLA.

STOPS PIPE LINE LEAKS

SIMPLY and QUICKLY

1. Whatever size leak may be, simply cut necessary length of GRO-CORD gasket to cover generously.
2. Cut a piece of plate, or any ready-made half sole or sleeve, to extend about 1" on both sides and both ends of the gasket.
3. Fit plate over the gasket so it extends beyond the GRO-CORD pipe repair gasket on all sides.
4. Clamp repair tight with a chain jack to shut off the leak. Use clamps to hold plate or half sole in contact with the pipe at all points. Weld all around and REMOVE CLAMPS. If desired, chain jack may be left indefinitely until welding equipment is available. Gro-Cord gaskets have been in service as long as 5 years before final weld.
5. Permanent welded repair after chain jack removed.

Specially shaped Gro-Card pipe repair gaskets are used by pipe line companies everywhere. Actually tested at 1600 p.s.i., Gro-Cord will not deteriorate. Oil resistant cotton impregnated stock lasts for years.

Jobber Inquiries Invited!
May be used with welded or clamped repairs. Write for folder OGJ 49.

SERVING OIL INDUSTRY 17 YEARS

DALLAS
GRO-CORD
PIPE REPAIR GASKETS
DALLAS MANUFACTURING & SALES COMPANY
POST OFFICE BOX 7181 DALLAS 9, TEXAS

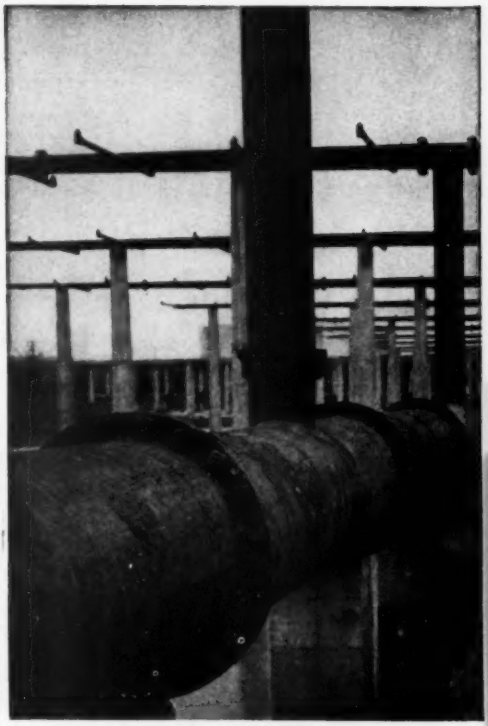
PROVED SUPERIOR BY PERFORMANCE

PHOENIX
Drop Forged
FLANGES

Drop forged of mild steel, especially suited to welding or machining. Of uniform strength and precision. Meet ASA requirements and ASME and ASTM specifications. Available in wide range of styles and sizes. Write for free catalog on the dependable Phoenix line today!

Flange & Hook Division

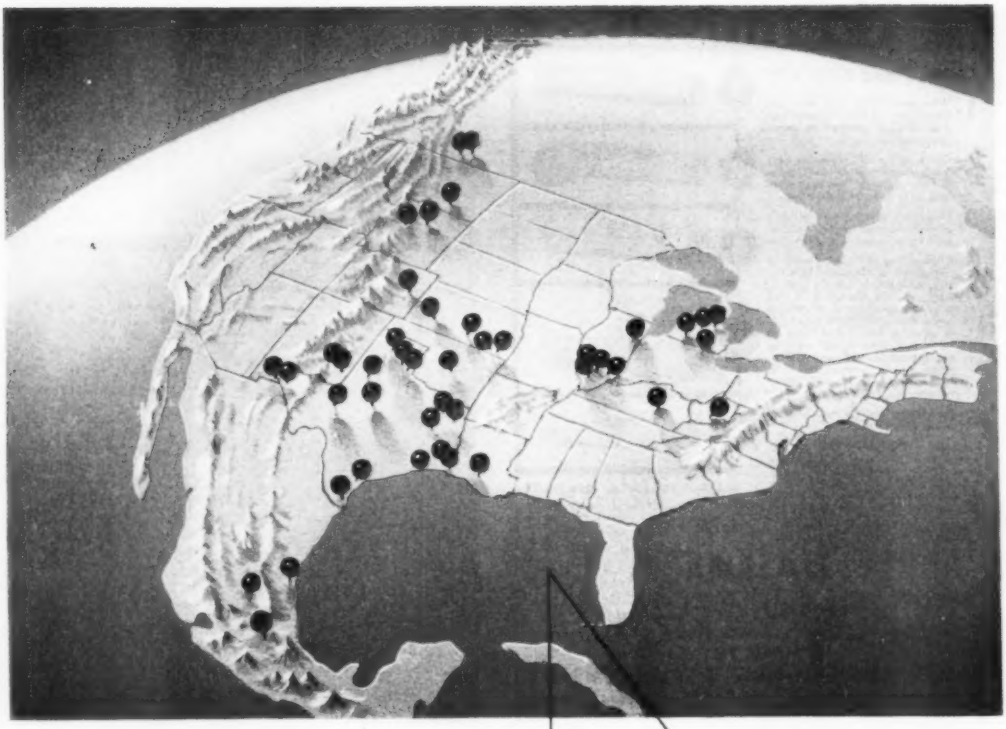
PHOENIX MANUFACTURING COMPANY
Catasauqua, Pa. Joliet, Illinois



AN ECONOMY FACTOR IN REFINERY OPERATION

Proved long life and stubborn resistance to corrosion make cast iron pipe a contributing factor in lowering plant maintenance per barrel of crude. Replacing shorter-lived pipe with cast iron pipe has demonstrated this in many refineries. Cost per term of service decreases. Interference with production, caused by frequent replacements, ceases to be a headache. Cast iron pipe works hand-in-glove with plant management to keep maintenance cost down in many refinery operations. Available with bell-and-spigot, plain end and flanged, or with standardized mechanical joints. Cast Iron Pipe Research Association, Thomas F. Wolfe, Engineer, 1015 Peoples Gas Bldg., Chicago 3, Illinois.

CAST IRON PIPE
FOR LONG LIFE AND ECONOMY



CYCLOVERSION*

IN NORTH AMERICA

44 Perco* Cycloversion units with a total design capacity of 154,000 barrels per day are now operating or under construction

Are you interested in upgrading your refinery through-put at low cost? Write for full information on Perco Processes

PHILLIPS PETROLEUM COMPANY

PERCO DIVISION—Bartlesville, Oklahoma

* A SERVICE MARK

REFINING

Labor Plentiful

Expansion, however, may create shortage next year

WASHINGTON.—There is no shortage of labor for the oil-refining industry—as of today.

But facilities now building may run into difficulties when they come into operation next year, it is indicated by a survey just made by the Department of Labor.

The refining industry is one of very few industries that have not already been seriously affected by the growing tightness of the labor market. Only 16 plants out of a total of 127 surveyed by the department reported recruitment difficulties, and in no case were labor shortages delaying production.

Reporting on the survey, Robert C. Goodwin, director of the Bureau of Employment Security, explained that while the refining industry has been expanding production steadily for more than a year the employment rise has been moderate. The study showed that in the year following the Korean outbreak production rose 16 per cent while employment increased 13 per cent. The figures were based on a canvass of plants accounting for 70 per cent of the industry's estimated 213,000 workers.

Expansion of capacity in the next few months is not expected to necessitate any great increase in employment, but further expansion beyond the early part of next year will probably increase labor requirements, Goodwin said, pointing out that the Petroleum Administration for Defense plans a 1,000,000-bbl. increase in capacity between January 1 of this year and the end of 1953.

Northwestern Gas-Recovery, Cracking Units Going Up

ST. PAUL PARK, Minn.—Construction is progressing here on catalytic cracking and gas-recovery units of Northwestern Refining Co.'s new refinery *(The Oil and Gas Journal, May 31, page 137)*.

These facilities are part of an expansion program designed to increase crude-processing capacity to 30,000 bbl. per day. Work is being pushed by Procon, Inc., on land adjoining the site of Northwestern's present 8,000-bbl. plant.

The cracking and gas-recovery facilities have already been authorized by a Defense Production Administration certificate, and company officials expect similar authorization to increase crude-distillation facilities. They have applied for permission to build a 30,000-bbl. skimming unit.

Though definite plans have not been disclosed, Elmer R. Erickson, Northwestern's general manager, said earlier this year that the company may get Canadian crude by way of the new Interprovincial Pipe Line Co. trunk line from Edmonton, Alta., to Superior, Wis.

The company also is interested in current exploration and development going on in North Dakota, Erickson said. New fields in that state would provide a nearby source of crude.

Shell Expands

50,000-bbl. enlargement set for Wood River plant

WOOD RIVER, Ill.—Shell Oil Co. has received a certificate for fast-tax write-off from the Defense Production Administration for a 50,000-bbl. per day expansion of its 120,000-bbl. per day refinery here.

The $42,500,000 program, biggest ever tackled at the plant, is expected to take 3 years to complete, according to H. D. Dale, refinery manager. Most of the money will be spent to replace existing obsolete equipment. Crude-oil distillation, catalytic cracking, alkylation, gas-processing, and products-handling facilities will be improved.

High-octane components for aviation gasoline will be provided by $3,800,000 extensions to the alkylation plant.

A new rectifier absorber with a liquid feed of 20,000 bbl. per day and a gas feed of 27,000 M.c.f. per day will be constructed in the stabilizing and gas-recovery section.

Breakdown.—DPA authorized Shell to amortize over a 5-year period 100 per cent of the alkylation facilities, 75 per cent of $23,800,000 for basic-refining equipment, 50 per cent of $14,800,000 for utilities, products handling, and blending facilities, and 15 per cent of $60,000 for building and other construction work.

The Wood River refinery was constructed during 1917 with an initial capacity of 7,000 bbl. per day. Expansion of the plant kept pace with market requirements and by the outset of World War II, the capacity had risen to 80,000 bbl. per day. Present enlargements will bring the total capacity to 170,000 bbl. daily.

The company also celebrated last week the twenty-fifth anniversary of its 8-in. pipe line from Wood River to the East Chicago, Ind., terminal. The line carried crude oil until 1940 when it was converted to products service. To the present it has car-

With DESCO You Stock Only HALF as many Plug Valve Lubricants

Only 4 DESCO Standard Service Lubricants are needed to service all the plug valves around the average plant. For those unusual cases there are 3 DESCO Special Lubricants.

With DESCO Lubricants you not only reduce your investment in lubricants but materially reduce the hazard of using the incorrect lubricant.

DESCO Lubricants are packed in bulk and in convenient individual sticks in 6 sizes, 12 to 24 sticks to a carton, 6 cartons in a case. Write for catalog 14-O.

DELTA-DESCO Plug Valve Lubrication SYSTEM

The DELTA-DESCO System combines the Delta High Pressure Gun, Adapter Fittings (or Automatic Lubricator), Specialized Lubricants, and Engineering Service. With it an operator can lubricate 10 to 15 valves in the time usually required to lubricate one—and do the job better!

DELTA AUTOMATIC Plug Valve LUBRICATOR

A simple device, automatically lubricates valve each time it is opened and closed. Write for Lubricator Catalog 15-O.

The Only Complete Plug Valve Lubrication Company

2

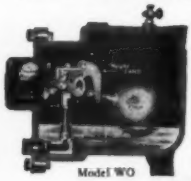
DELTA ENGINEERING SALES CO.

806 Louisiana Ave • Phone 5-2416

SHREVEPORT, LOUISIANA, U.S.A.

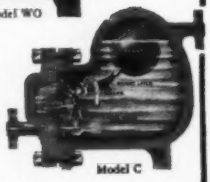
Sales Offices in All Principal Cities

Catalog 250 Describes
NICHOLSON
Gas Well Traps
for
Separators, Accumulators,
After-Absorbers,
Heaters, and Compressors



Top trap for press. to 650 lbs.; bottom, to 1500.
Model WO

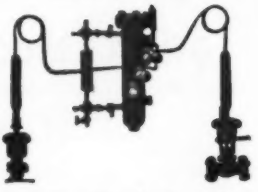
Both types widely used for discharging gasoline, water and oil.



Model C

W. H. NICHOLSON & CO.
210 Oregon St., Wilkes-Barre, Pa.

EXPLODE



...The Explosion Jinx!

Periodic explosions need NOT be accepted as occupational hazards wherever boilers are used. Thoroughly-tested INFERNO Automatic Boiler Safety Units offer complete safety, with automatic feed-water control backed up by an automatic low water alarm and automatic fuel cut-off valve. Automatic action, in maintaining the proper water level in boilers, not only affords efficient operation but gives positive action and safety. Ask for Bulletin 15-B. All Inferno products sold through regular supply stores.

The INFERNO CO.
Box 1138A
115 RICOU St.
SHREVEPORT, LA.

ried more than 238,000,000 bbl. of products.

Exports of Tin Plate for Oil-Packaging to Increase

WASHINGTON. — Permissible exports of tin plate for petroleum packaging in the first quarter of 1952 will be more than three times the quota for the current quarter under allocations just made by the Office of International Trade.

An increase in the quota from 5,000 tons for this quarter to 16,000 tons for the first 3 months of 1952 was ordered in the face of a cut in overall tin-plate exports from 125,000 to 115,000 tons.

The larger quota for petroleum packaging, OIT officials explained, is designed to meet important requirements in areas where inadequate transportation and storage facilities necessitate the use of small containers and in operation of American oil companies in certain foreign territories in which high humidity, as well as secondary use of containers for food, native oils, etc., necessitate a protective coating of tin. A further important consideration was that use of materials other than tin-plate is impracticable for many petroleum products.

Cyclohexane Producers May Apply for Higher Ceilings

WASHINGTON.—Aiming at increasing the production of cyclohexane, the Office of Price Stabilization this week issued a regulation making it possible for manufacturers to apply for higher ceiling prices.

Cyclohexane normally is produced by only a few refiners but currently is of increasing importance as an alternative to benzene in nylon manufacture. Refinery yield is low, and production consequently is relatively small. In order to increase output producers must meet higher production costs and make sizable capital investments.

OPS officials said that while prices of cyclohexane during the base period of January 19, 1950, to January 25, 1951, reflected both cost of production and the prices of competitive hydrocarbons, they have not been high enough to permit building and operating the additional fractionating equipment needed to secure higher recoveries.

Supplementary Regulation 2 to CPR 17, under which ceilings are now fixed, will permit the director of price stabilization to adjust a seller's ceiling price on the basis of increased operating costs and of capital expenditure for new and improved producing facilities made after January 25, 1951. Adjustments may be requested by a producer in an application to the petroleum branch of OPS.

Oil-Tax Receipts Up

WASHINGTON.—Treasury receipts from the three oil taxes in the first 9 months of this year topped 1950 figures by more than $35,000,000, according to the monthly report of the Bureau of Internal Revenue.

Collections up to the end of September included $436,573,260 from gasoline against $408,384,731 in the corresponding period last year; $65,479,722 from lubricating oils against $62,018,332, and $18,778,582 from pipeline transportation against $15,002,792, bureau figures show.

OIL AND GAS BURNING EQUIPMENT
for
PETROLEUM REFINERIES
Detailed Information Gladly Sent Upon Request
CHEMICAL-PETROLEUM DIV.
NATIONAL AIROIL BURNER COMPANY INC.
1236 E. Sedgley Ave., Philadelphia 34, Pa.
Southwestern Division: 2512 So. Blvd., Houston 6, Tex.

"GUNITE" CONCRETE
(SINCE 1915)
LININGS FOR
BUBBLE TOWERS • SETTLERS • STILLS • SEPARATORS • TANKS • AND VESSELS OF ALL TYPES • ENCASING AND FIREPROOFING STRUCTURAL STEEL AND PIPE • LINING WATER RESERVOIRS, DITCHES, DRAINS, AND CANALS • REPAIRING DISINTEGRATED CONCRETE AND OTHER MASONRY.
See our catalog in Sweet's
GUNITE CONCRETE & CONST. CO.
1301 Woodswether Road, Kansas City 6, Mo.
DISTRICT BRANCH OFFICES
Paul B. Watts, 228 N. La Salle St., Chicago 1, Ill.
George R. Lewis Co., 2036 Queen Avenue S., Minneapolis 5, Minn.
B. H. Mueller Co., 6625 Delmar Blvd., St. Louis 5, Mo.
Ole K. Olsen Co., 823 Perdido St., New Orleans, La.
Philip D. Barnard, 2036 Addison, Houston 5, Tex.
Western Steel Prod. Co., 1735 W. 13th Ave., Denver 4, Colo.

ALLOY STUDS
to your
specifications
For better alloy fastenings, try VICTOR—over 30 years of service to the petroleum industry. Prompt quotations furnished.
Ask for the new VICTOR catalog
VICTOR PRODUCTS CORP.
2635 W. BELMONT AVE. • CHICAGO 18, ILL.

FLOAT CAGES

• No. 161D Packless Float Cage actuating No. 66B Packless Balanced Valve.

FOR LIQUID LEVEL CONTROL SERVICE

DAVIS Float Cages are used in connection with closed tanks where fluctuation of the fluid level within the tank is the governing factor in the control of all types of electrical switches, control valves, pilot valves, (for operation of diaphragm motor valves), motors and other equipment. Davis fluid control equipment also includes internal float units for direct or pilot operation. Whatever your requirement may be, Davis can supply you with a combination of float cage and control valve to make your control accurate, positive, and dependable.

Drop us a card today for detailed information on the Davis line. Ask for Bulletin 101AA.

DAVIS REGULATOR COMPANY
2543 So. Washtenaw Ave., Chicago 8, Ill.

TAC does what no other tool can do!

AT LAST! AN OPEN-END RATCHET WRENCH — the world's first true *universal* wrench. A patented design for connections on tubing, rods, piping, conduit, studs, etc. Sixty-four socket sizes from ⅜" to 4". Smallest effective ratcheting arc yet — 5° to 7½°. TAC will also do every job any ordinary ratchet wrench will do: one TAC set replaces literally dozens of single-purpose hand tools.

makers of advanced tools for industry

TAC

TUBING APPLIANCE CO.
7112 South Victoria • 10321 Anza Ave. • Los Angeles, Calif.

SAVE TIME—SAVE TUBES

Clean Exchangers Chemically

The quickest and (in the long run) cheapest way to clean tubular heat exchangers is the in-place method of circulating hot solutions of chemical cleaning compounds.

METHOD: Circulate powerful Oakite detergent through oil side to remove carbon, wax, oil deposits. Circulate Oakite Compound No. 32 through water side to remove scale and rust. Quickly restores unit to peak heat transfer efficiency. Much quicker, more thorough than lancing with air or steam. No expensive dismantling. No damage to tubes as with rodding, drilling, or fish sawing.

Ask your local Oakite Technical Service Representative for on-site demonstration. Or write for full details. No obligation either way.

FREE Booklet F7629 gives Oakite story on cleaning heat exchangers; cleaning towers; reconditioning drums; cleaning tank cars; cleaning salvage parts. Write for your copy today.

OAKITE PRODUCTS, INC., 52E Thames St., NEW YORK 6, N. Y.

SPECIALIZED INDUSTRIAL CLEANING

OAKITE

MATERIALS • METHODS • SERVICE

Technical Service Representatives in Principal Cities of U. S. & Canada

NOW IT CAN BE TOLD

GLOBE
"2-CUTTER"
INTEGRAL
JET ROCK BITS

Globe Jet Rock Bits are mac
in all popular sizes from 8½
to 15" in types SS2C, S2
M2C, MH2C, and H2C.

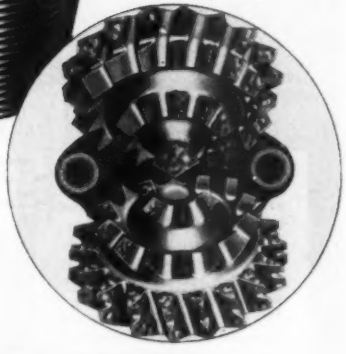
Perfected after 2 years of field testing

Now, after two years continuous development work, Globe proudly presents their complete line of "2-Cutter" Integral Jet Rock Bits . . . engineered and designed for the extremely high pressures of jet drilling . . . performance proved in all formations.

Always a leader, Globe pioneered the development of the integral jet principle. Everywhere, the results have been the same, regardless of formation . . . hole is completed in much less time with a far less number of drilling bits . . . a real savings in drilling costs.

Get factual information on these revolutionary new jet bits now . . . available from your nearest Globe representative.

Jet nozzles are placed for maximum penetration • proper bottom hole impact • thorough hole and bit cleaning • made of Tungsten-Carbide in 5/16", 3/8", 11/16" and 3/4" sizes.



GLOBE
OIL TOOLS COMPANY
GLOBE
Serving the Petroleum Industry

Branches In. BAKERSFIELD AND VENTURA, CALIFORNIA • CASPER, WYOMING • DALLAS HOUSTON, ODESSA AND TYLER, TEXAS • DUNCAN, OKLAHOMA • LAKE CHARLES, LOUISIANA.

Main Office and Plant:
LOS NIETOS, CALIFORNIA

Among the

Drilling Contractors

Longhorn Contracts for Two Texas Deep Tests

Longhorn Drilling Corp., San Antonio and Three Rivers, Tex., has been awarded contracts for two additional deep tests in South and Southwest Texas. One is with H. R. Smith and associates for 1 Mabel Adami, a projected 8,000-ft. wildcat a mile west of the shallow Adami field, 18 miles northwest of Freer, in northeastern Webb County.

The other is with Sunray Oil Corp. for 1-A Smith, a semiwildcat in the T. B. Reese Survey, 2½ miles east of Ray Point, in northeastern Live Oak County. Location of the latter test, also projected to 8,000 ft., is 1,650 ft. southwest of Sunray's 1 Smith, recently completed as a discovery oil well in the Machank (Wilcox) sand.

J. C. Means, Beaumont, Tex., has a contract with Sun Oil Co. for a 10,000-ft. wildcat test to be drilled near Arnaudville, St. Landry Parish, southern Louisiana. Location is for 1 Higginbotham Unit, in 38-7s-5e.

Tippett Drilling Co., Shreveport, is making hole on a newly started wildcat a half mile south of Montgomery, Grant Parish, Louisiana. The test is being drilled under contract for Kenilworth Oil Corp. Location is on the operator's Dyson lease in the NE NE NW 29-8n-5w. Hole is projected to the Wilcox, expected around 4,500 ft.

Creighton Drilling Co., Tulsa, contracting for Cummings-McIntyre and associates, is starting its third well in the new East Pond Creek pool, Grant County, Oklahoma. The rig, used on the discovery well (1 Combs), completed 2 months ago as a Wilcox producer at a total depth of 5,950 ft., has just completed the first confirmation well, a northeast offset to the discovery well. Present operation, 1 Johnson, NW NW SW 5-25n-5w, is a southeast offset.

M. B. Armer, Wichita, has a rig on a wildcat location in Hodgeman County, western Kansas, where it is drilling for Harry Koplin and associates at 1 Housman, NE NE SE 1-23-22.

Rainbow Drilling Co., El Dorado, Ark., has taken a contract for a 6,500-ft. Smackover lime test to be drilled for Martin Wunderlich at a wildcat location 1½ miles northeast of the Lisbon townsite, Union County, Arkansas. Location has been made in the C SW NW 36-16s-17w, on the operator's Reynolds-Gammell lease. It is 3 miles west of the Lisbon field, nearest production.

Fitzpatrick Drilling Co., Casper, Wyo., is drilling at Ryan Oil Co. 2 Woodland, SE SE NW 2-7n-48w, a wildcat location in southeastern Logan County, Colorado.

Foster Drilling Co., Cushing, is moving a rig to a semi-wildcat location, ¾ mile from production, in southern Payne County, Oklahoma, where it will drill for Deep Rock Oil Corp. at 1 Correll, SW SE SW 11-18s-4e.

Quaker Drilling Co., Inc., Wichita, is drilling for Alpine Oil & Royalty Co. at a wildcat location in the NE NE SW 12-16-15, northwestern Barton County, Kansas. Location, on the operator's Karst lease, is 3 miles southeast of the Boxberger pool (Russell County), and 5 miles west of production in the Trapp field.

Pete Morris, Ada, Okla., contractor, has a new operation under way in the Bebee area, Pontotoc County, Oklahoma. He is drilling for S. C. Yingling. Location is in the SE NW NE 22-5n-4e.

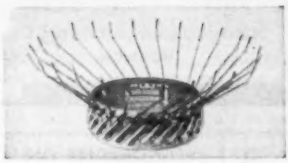
Reaves Drilling Co., Cushing, Okla., is contracting for Jernigan & Morgan on a projected Red Fork sand test, 1 Taylor, located in the SE SE SW 1-19n-4e, a mile northwest of the West Garr pool, Payne County, Oklahoma. Objective is expected around 3,600 ft.

Circle Drilling Co., Lake Charles, La., has moved a heavy-duty rotary rig to a wildcat location 7 miles west of Alexandria, Rapides Parish, Louisiana, where it will drill for Bates & Cornell of Lafayette, La. The new operation is 1 Carter, in 63-4n-2w. Contract is for 7,000 ft., sufficient to test the Wilcox sand.

Greyhound Drilling Co., Houston, is the contractor and working-interest participant with Michael T. Halbouty at a newly started Travis Peak test, 1 Tooker, located in the C NW NW 18-20n-14w, on the east flank of the old Pine Island field, Caddo Parish, northwestern Louisiana. Location is 2 miles southwest of Belcher.

M. B. Armer Drilling Co., Inc., Wichita, has started drilling on another wildcat job for Harry Koplin

B and W SCRATCHERS AND CENTRALIZERS FOR A GOOD CEMENT JOB



B and W MULTI-FLEX SCRATCHERS

1. SCRATCH ON THE UP-STROKE won't "tear up" the hole while running in.
2. RUGGEDLY CONSTRUCTED... Can "take it" on the casing rack and in the hole.
3. LONG, STRONG, REVERSIBLE Multiple wire scratching fingers—5 inches long—are flexible, sturdy and scratch thoroughly.

a GOOD combination with B and W LATCH-ON CENTRALIZERS

Strongest, Safest and Easiest to Install!

B and W Incorporated

• Well Completion Specialists •

WEST COAST — 3545 Cedar Avenue, Long Beach 7, California, Long Beach 4-8366
GULF COAST — P. O. Box 5266, Houston 12, Texas, Phone WEntworth 6603

Standco
NO SMOKE
STANDCO BRAKE LINING
Is the driller's best friend because it makes the easiest brake known and "feeds off evenly while drilling." It never scores brake rims. See pages 3608-3613. Composite Catalog.
Standco Brake Lining Co.
HOUSTON

CONTACT YOUR FAVORITE SUPPLY HOUSE
STANDARDIZE ON
PARMACO
CASING AND DRIVE SHOES
•
SIZED CORRECTLY
•
PARMACO
The House of Courteous Service

and associates. Location is 14 miles southeast of the Jetmore pool in Hodgeman County, western Kansas. The spot is in the NE NE SW 1-23-22, on the operators' Housman lease. This contractor has been associated with Koplin as contractor and joint operator on a number of wildcat and development wells in western Kansas within the past year.

Delaney Drilling Co. has the contract for a 5,300-ft. wildcat test which Deep Rock Oil Corp. has projected for the area about 1½ miles southeast of West Pauls Valley pool and about same distance north of the Whitebead pool, in Garvin County, Oklahoma. Location is in the NE SE NW 34-4n-1w, on the operator's Lam lease.

Peel Brothers, Hoisington, Kans., are drilling for Anschutz Drilling Co. at 1 Chaloupka, a wildcat location in the SW SW NE 25-16-14, Barton County, Kansas.

Tuley & Carter Drilling Co., Evansville, Ind., has a rig working in the Southeast Reimer area, Cheyenne County, Nebraska, where it is drilling for Westbury Petroleum Co. at 1 Schultz, in 26-16n-50w. This contractor only recently entered the active play in the Denver-Julesburg basin.

Transit Corp., Great Bend, Kans., is the contractor on a wildcat test which Colorado Fuel & Iron Co. is drilling in the Ordway area, Crowley County, Colorado. The test is the operator's 1-A State. Location is in the SW SW NE 36-18s-56w.

Kern & Trimble Drilling Co., Magnolia, Ark., is starting its second well for Skelly Oil Co. in the area 1½ miles northwest of the Northeast Fouke field, Miller County, Arkansas. The new operation is 1 Purifoy, SE SE NE 19-16s-26w, northwest offset to Skelly's 1 Philyau, initial test in the area, now being put on the pump as an indicated discovery producer in a pay zone at 5,840 ft.

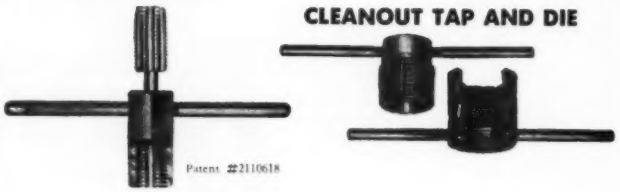
Zack Brooks Drilling Co., El Dorado, Ark., has moved a rig to a wildcat location 4 miles southwest of Three Creeks, southern Union County, Arkansas, where it will drill for Murphy Corp. at 1 Chester, C NE NE 32-19s-17s. Location is about 6 miles from any other production, nearest being in the Tubal field, to the west.

Midwestern Drillers, Inc., Liberal, Kans., has a wildcat job under way in southern Meade County, southwestern Kansas, where it is drilling for Alpine Oil & Royalty Co. This new operation is 1 Bromwell. Location, in the C SW NW 7-34-29, is about 2 miles north of the East Adams Ranch pool, and about 4 miles southeast of the Novinger pool.

ACTIVE ROTARY RIGS*
(United States and Western Canada)

Area—	Week ended 11-5-51	Change week ended 10-29-51	Change week ended 11-6-50
Gulf Coast	646	+23	+80
W. Tex.-N. M.	1,045	+17	+248
Ark.-N. La.-E. Tex.	188	+4	+28
Oklahoma	311	—18	+31
Kansas-Nebraska	195	—4	+41
Illinois-Eastern	166	+11	+18
Rocky Mountains	196	+2	+66
Pacific Coast	171	—4	+31
Total U. S.	2,918	+31	+543
Western Canada	152	—2	+33
Total	3,070	+29	+576

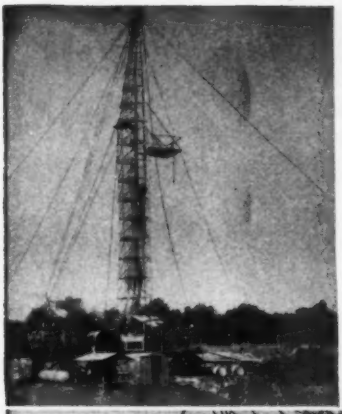
*Courtesy Hughes Tool Co. Trends in drilling activity in the United States and the West Texas-New Mexico and Oklahoma-Kansas areas are shown on pages 234 and 235.

BAIRD - - - TOOLS
CLEANOUT TAP AND DIE

Patent #2110618
For — cleaning up smashed or dirty threads on —
★ Slush Pumps
★ Piston rods
★ Valve cover and cylinder head studs
★ Extension rods—
★ Sucker rods—
★ Tubing on line pipe
★ Blowout preventer studs
Any diameter — any number of threads per inch.
*Always available at your supply store
Baird Manufacturing Co.
Box 380 — Tulsa

M-SCOPE PIPE FINDER

MODEL AB
ONE MAN OPERATION
METAL CABINETS
HEAVY DUTY PERFORMANCE
ONLY
$149.50
FISHER RESEARCH LAB., Inc.
PALO ALTO CALIF.

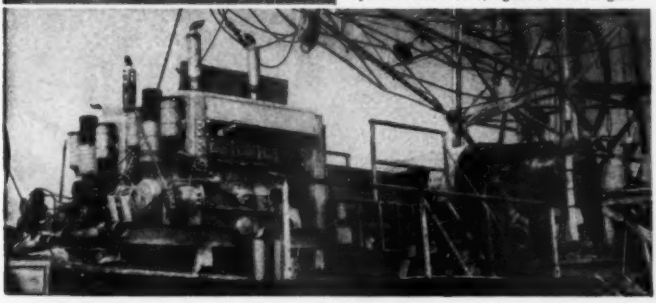
Beene-Hurley Use Low Cost Power on Frank's Rig!



Drillers Beene and Hurley at Bossier City, La., use Frank's portable rig with four Minneapolis-Moline 1210-12A units for power. They are drilling low-cost wells to depths of 6500 feet. The 1210-12A, 12 cylinder unit engines are factory equipped to operate on LP gas or natural gas—the low priced fuels in this area.

Beene and Hurley have mounted two of these units on the drilling table to furnish power to the draw works. These engines are equipped with front power take-off drives and supply 400 hp with LP gas. The other 1210-12A units are remotely located on the mud pump. The complete engineering and installation was done by Beene and Hurley at Shreveport.

Mud pump installation is powered by two MM 1210-12A's.



Two MM 1210-12 on the drilling table operate on low-cost, higher octane LP gas.

This arrangement combines flexibility of layout with important time saving for setting up the rig. Precision tooling and high production methods account for the extremely low selling price of MM heavy-duty oil field power units. Standardization of parts permits interchangeability which assures easier, lower-cost maintenance.

Sales and service of MM oil field engines are handled by the Shrimpton Manufacturing and Supply Co., with branches at Los Angeles, California; Oklahoma City, Oklahoma; and Kilgore, Texas.

X A.P.I. COUPLINGS FOR OIL FIELD USE

EVERY SIZE AND TYPE FROM *ONE* SOURCE

LINE PIPE COUPLINGS A.P.I.
⅛" to 12"—Seamless and Special Processed—Black or Galvanized

PLAIN TUBING COUPLINGS A.P.I.
1" to 3"—Seamless

EXTERNAL UPSET TUBING COUPLINGS A.P.I.
¾" to 3½"—Seamless

CASING COUPLINGS A.P.I.
4½" to 13⅜"—Long or Short

HYDRAULIC COUPLINGS
⅛" to 3"—Seamless

REAMED AND DRIFTED A.I.S.I.
¾" to 12"—Seamless or Spl. Processed

DRIVE PIPE COUPLINGS
⅜" to 12"—Seamless or Spl. Processed

Consult Our Nearest Quick Service Sales Office:

Albany, N. Y.—Albert L. Becker, 434 Clinton Ave.
Baltimore—Ted Berto, 2301 N. Charles St.
Boston—Wm. F. Bennett, 24 Spring St., Somerville
Buffalo—W. E. Spencer & Assoc's, 241 S. Elmwood Ave.
Chicago—Harry A. Jay, 122 So. Michigan Ave.
Denver—Earl H. Jones & Co., 1863 Wazee St.
Detroit—Thomas L. Osberger, 19451 Livernois Ave.
Erie, Pa.—R. J. Massi, Box 711
Houston—Henry H. Paris Distributor, Inc., Box 932
Kansas City, Mo.—Wm. J. Hebenstreit, 3122 Coleman Rd.
Los Angeles—James A. Riordan Co., 1400 Santa Fe Ave.
Minneapolis—Lin J. Krause, 200 Lumber Exchange
Newark, N.J.—Murray Eskin, Industrial Office Bldg.
New York—Henry Stein, 50 Cliff St.
Philadelphia—J. W. Worthington, 401 N. Broad St.
Portland, Ore.—Earl H. Jones & Co., 1233 NW 12th Ave.
Richmond, Va.—P. C. Abbott & Co., Mutual Bldg.
San Francisco—Earl H. Jones & Co., 1150 Folsom St.
Seattle—Earl H. Jones & Co., 619 Second Ave.

FACTORY 'PHONE: WOODSDALE 3296

WHEELING MACHINE PRODUCTS COMPANY
ELM GROVE STATION — WHEELING, W. VA.

Experience and Equipment for operations Anywhere

. . . A FACTOR THAT COUNTS! National has surveyed areas in mountains, swamps, plains, and oceans from the Gulf to the Arctic in all kinds of weather. Wherever and whatever the operational difficulties may be, National has the experience and equipment to successfully do the job.

CONSULT **NATIONAL** TODAY

National
GEOPHYSICAL
COMPANY, INC.
MIDLAND DALLAS HOUSTON
CALGARY, CANADA

LEADING THE FIELD OF SEISMIC EXPLORATION

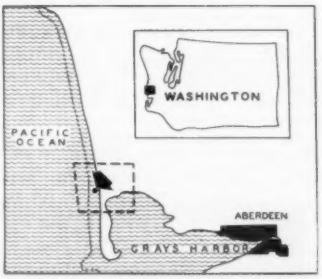
Washington's Wildcat

WASHINGTON'S wildcat is still not eligible for classification as a discovery but the results of preliminary testing of this well have been encouraging enough to have caused a revival of interest in the potentialities of the Grays Harbor area.

The wildcat, Hawksworth et al. 4 State, was drilled to a total depth of 3,711 ft. Three high-pressure gas sands were penetrated in the 126 ft. of hole cut after topping the Miocene-Kincaid zone at 3,585 ft. Casing was set at the top of the Kincaid, a perforated liner hung, and on an 8½-hour test through a small tubing choke the well flowed gas at rates of 500,000 to 2,000,000 cu. ft. daily with a potential recovery of 47°-gravity oil estimated at 35 to 100 bbl. daily. Reported pressures were 1,000 psi. on the tubing and 1,200 psi. on the casing. The well is now waiting on gas traps coming in from California for conclusive testing.

Essentially all of the area covered by the large-scale sketch map is considered favorable for the accumulation of petroleum. Grays Harbor area is the location of Washington's thickest deposits of Pliocene and Miocene sediments. Beds exposed in this deep basin are upper Miocene in age with exposures of Oligocene and Eocene coming in to the north, east, and south as the beds climb toward the Olympic Mountains, the Cascade Range, and the Willapa Hills, respectively. This basin has long been recognized as potential oil country though at least six deep, scientifically located tests have been completed dry in the area.

The 4 State, located below mean high-tide line (arrowed dot on map), is the third test drilled in Section 15 of 18n-12w (Willamette Meridian), Grays Harbor County, where seismograph and subsurface studies conducted by Union Oil Co. of California indicated the apex of a large structure. Union drilled its 1 State to 6,278 ft. but collapsed casing prevented adequate testing below 4,000 ft. Though some oil was recovered from a 90-ft. interval at about 4,000 ft., a commercial producer was not indicated and the well was completed dry. Less than 100 ft. from this well Union drilled its 3 State to a depth of 9,344 ft. This well, which penetrated a much greater thickness of



Miocene sediments than had been anticipated, tested perforations at intervals between 3,670 and 6,400 ft. A small amount of high-gravity oil and a little gas were recovered from the intervals 3,670-4,440 ft. and 4,663-76 ft., but the hole could not be kept clean because of sloughing shales and was completed dry. Union 2 State, about 6 miles to the west in 10-18n-13w, was drilled to 3,850 ft. in the Pliocene and found only a small show of oil.

The 4 State is located in the southwest quarter of Section 15, just 550 ft. southwest of 3 State. It was drilled on the basis of the shows of oil recovered in the section's two previous wells and with the idea that the heavy mud required to control the high gas pressures encountered and to support the hole in certain sections had blocked the producing surface in the well bore. To lessen the possibility of blocking, the 4 State was carried only 126 ft. into the Kincaid though an additional 800 ft. of alternating sandstones and fractured shales of this oil-bearing zone was found by Union's wells.

Though little is known about the attitudes of the Tertiary rocks in the Grays Harbor area it is believed that the structure on which 4 State was drilled is cut by east-west faults which may control the distribution of any oil and gas that are present.

The 20,000-acre block owned jointly by Hawksworth et al. and Los Nietos Co. (a wholly owned subsidiary of Union) is outlined by the broken lines on the map. Hawksworth reports that he is preparing to drill another well 1 mile or so east or southeast of 4 State.

Philip C. Ingalls.

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

WEST TEXAS.—Magnolia 1 Bertha Nolley, second test for the new Nolley Wolfcamp field in north Andrews County, developed better than 39 bbl. of oil in 2 hours, on drill-stem test at 8,126-60 ft. in the Wichita Albany, above the Wolfcamp. On the Wichita section, it was 43 ft. high to the discovery. Sinclair confirmed Pennsylvanian production east of its recent extension north of Pegasus. The 1 June Tippett has been completed for 273 bbl. of oil a day.

CALIFORNIA.—Believed to be the highest producing well in California, E. W. Pauley 36 Biow (formerly Standard Oil Co. of California 101 Wigdal) opened a new deep pool 1 mile northwest of Aliso Canyon field limits.

ROCKY MOUNTAIN AREA.—Amerada Petroleum Corp. is plugging back 1 Iverson, first discovery well in the Williston basin, for tests of the Madison. The well has produced for 5 months from the Devonian. Shell Oil Co. is plugging back at its Pine unit, Montana, wildcat after drilling to 9,746 ft. Carter Oil Co.'s West Poplar wildcat is nearing the Mississippian pay found at East Poplar, Roosevelt County. Seaboard Oil Co. is completing its new Whistle Creek, Wyoming, wildcat after the well flowed 208 bbl. of oil daily from top of Tensleep.

KANSAS.—Three Graham County wildcats indicate new Lansing-Kansas City producing areas: Prime Drilling Co. 1 Stober, 1-9s-25w; Peel & Hardman 1 Legere, 21-8s-23w; Sitrin and Murfin Drilling Co. 1 Morris, 32-7s-22w.

A novel of the oil country of the great Southwest

by ELINOR PRYOR

"Masculine in its skillful production . . . it rings true from the erection of the derrick and the first spudding–in to the sure-fire high drama of bringing in a well . . . A swift, well told story of one man's career in oil."—*Chicago Tribune*

JUST PUBLISHED

At all bookstores • $3.75

McGRAW-HILL BOOK CO., Inc.
330 West 42nd St., N. Y. 18

Oklahoma

Southeast Coyle Pool Gets Mile Extension

SUNRAY OIL CORP. and O'Rourke-Baker Drilling Co. have extended production of the Southeast Coyle pool in eastern Logan County a mile southeast at their 1 Wallace, SW SW SW 22-17n-1e. Testing the pool's second Wilcox sand pay zone, the well flowed initially at the rate of 30 bbl. of oil per hour. Placed on a ¾-in. choke, it flowed 290 bbl. in 15 hours, averaging 19⅓ bbl. per hour. Later, it was flowing at an average rate of 16 bbl. per hour.

Top of the second Wilcox zone is 5,106 ft. with top of the sand at 5,109 ft. Hole, drilled to 5,110 ft., is open below 5,102 ft. No water was indicated.

The well also is a potential producer in the first Wilcox sand, a new pay zone for the area, topped at 4,988 ft., and in which at 60-minute drill-stem test at a depth of 4,999 ft. recovered 570 ft. of 42°-gravity oil with 300 ft. of oil-cut mud and 30 ft. of brackish, oily water.

The Southeast Coyle pool was opened last summer. Its eighth producer, located at the southeast edge of the pool, now is being completed by Zephyr Petroleum Corp. at its 1 Thompson heirs, NW SW NE 21-17n-1e, where the second Wilcox sand was topped at 5,114 ft.

Discovery of another second Wilcox sand pool is indicated in western Payne County where Blackwell Oil & Gas Co. got a substantial oil and gas flow in a drill-stem test of that sand at 5,238 ft. in its 1 Gerrish, NE NE SE 20-18n-1e. Test took in an interval from 5,200 ft. with top of the sand at 5,226 ft. Oil flow, starting 18 minutes after the tester was opened, was estimated at 30 to 40 bbl. per hour. Gas was at the surface in 4 minutes with flow estimated at 300,000 to 500,000 cu. ft. per day. Tester was open 40 minutes. Gravity of the oil was 40°. Location is 2 miles northwest of the Southeast Paradise pool, which produces from Bartlesville sand with three wells.

Williams-Copeland, Inc., has an indicated Layton sand well offsetting Wilcox sand production on the east flank of the Lucien pool in Noble County. A 60-minute drill-stem test at 3,901-09 ft. in Layton sand, topped at 3,898 ft., flowed gas in 21 minutes and yielded 30 ft. of free oil with 180 ft. of heavily oil and gas-cut mud. Casing was run through the pay to 3,983 ft. after hole was drilled to 4,118 ft. Operators are preparing to perforate for production tests.

OKLAHOMA SUCCESSFUL WILDCATS

Garvin County: Magnolia Petroleum Co. 1 Burns, NW SE NW 34-4n-2w, flowed 122 bbl. 40°-gravity oil from lower first bromide sand at 6,249-6,334 ft., TD; geological wildcat in SE Maysville.

Noble County: T. N. Berry Co. 1 Nelson, NE NW NE 30-20n-1w, flowed 7,300,000 cu. ft. gas from Perry at 3,438-40 ft., TD 4,395 ft.

Osage County: Oliphant 1 Osage, W ½ W ½ SE 4-25n-4e, pumped 60 bbl. oil from Mississippi chat at 3,432-70 ft., TD.

Payne County: Sinclair Oil & Gas Co. 30 Crockett, SW NE SE 13-19n-5e, pumped 12 bbl. 40.5°-gravity oil from Peru at 2,733-45 ft., TD 3,595 ft., geological wildcat in Yale-Quay.

Pottawatomie County: Sunray Oil Corp. 1 State, NW SE SE 16-8n-2e, flowed 132 bbl. 24°-gravity oil from Hunton at 5,210-40 ft., TD 6,069 ft.

Helmerich & Payne, Inc. 1 Cope, NE NE SW 2-8n-3e, pumped 5 bbl. 36°-gravity oil from dolomite at 5,070-96 ft., TD.

Seminole County: Osborn 1 Carpitchie, NE SE NE 11-5n-7e, flowed 25 bbl. 38°-gravity oil from Gilcrease sand at 2,530-50 ft., TD 4,427 ft., geological wildcat in Allen district.

Miller 1 Woolridge, SE NW SW 27-8n-5e, pumped 125 bbl. 40°-gravity oil from Simpson dolomite at 4,408-11 ft., TD 4,440 ft.

Stephens County: Skelly Oil Co. 1 Robberson "A," SW NE SE 34-1s-5w, flowed 57 bbl. 42°-gravity oil from Springer at 4,420-30 ft., TD 5,300 ft., geological wildcat in Velma.

OKLAHOMA WILDCAT FAILURES

Beaver County: Kingwood 1 Davis, NE NE NE 16-3n-21ecm, dry, TD 7,388 ft.

Carter County: Howell 1 Hooks, SW SW NE 8-1s-2w, dry, TD 2,375 ft., geological wildcat in Homer.

Choctaw County: Jordan 1 Jordan Ranch, SW SE NE 4-6s-16e, dry, TD 1,250 ft.

Comanche County: Atkinson 1 Blumenshine, NE NE NE 12-2n-10w, dry, TD 3,316 ft.

Cotton County: Blair 1 Bone, NE NE SW 8-4s-10w, dry, TD 1,400 ft.

Creek County: Buffalo Oil Co. 1 Morrison, C E/2 SW 19-16n-10e, dry, TD 2,870 ft.

LeFlore County: LeFlore Gas & Electric Co. 1 Wilson, C NW NE 23-5n- 25e, dry, TD 4,397 ft.

Lincoln County: Kingery-Patterson et al 1 Eby, SE NE SE 2-13n-4e, dry, TD 4,330 ft.

Biffle et al 1 Henin, SW SW NW 35-15n-6e, dry, TD 4,294 ft.

Noble County: Skiles Oil Corp. 1 Manzilla heirs, NE NW SE 31-21n11e, dry, TD 5,442 ft.

Oklahoma County: Harper-Turner Oil et al 1 Monk, C NE SW 15-14n-3w, dry, TD 6,625 ft.

Pawnee County: Cox 1 Watchorn heirs, SE SW SW 15-22n-3e, dry, TD 4,278 ft.

Pottawatomie County: Stephens Petroleum 1 Marshall "A," SE SE NW 34-10n-4e, dry, TD 4,861 ft.

Seminole County: Lario and Globe 1 Chupco, NW SW SE 34-9n-8e, dry, TD 3,443 ft.

Stephens County: Cox 1 Lowery, NE SE SE 2-3s-5w, dry, TD 3,608 ft.

P. G. Lake and Mercury Drilling 1 Dyche, SW SW NE 26-1n-4w, dry, TD 7,003 ft.

TWO BEST Buys FOR YOU

BUY #1

ALTEN *Stubby* TUBING HEAD

Squatty design cuts installation costs by lowering well installation height.

Furnished with a variety of gland and ring types to suit individual applications.

Lowest selling price in competitive class.

Uniform wall thickness gives extra safety.

Available in all standard sizes and threads.

BUY #2

ALTEN WONBOLT POLISHED ROD CLAMPS

Grips Like a Vise, holds over 35,000 lbs., only one nut to secure . . . Buy ALTEN at your local supply store.

ALTEN MAKES THE WORLD'S BEST PUMPING UNITS.

ALTENS FOUNDRY & MACHINE WORKS INC.
LANCASTER, OHIO

TANKER OR BARGE

DOCK

CHIKSAN MARINE & BARGE HOSE

LIGHT WEIGHT • EASY TO HANDLE

With the **CHIKSAN** aluminum Marine & Barge Hose, dock-to-vessel connections can be made by one man in just a few minutes. When not in service, the hose easily and quickly folds into a compact unit, without requiring disconnection from the Dock Riser. The same hose can be used for both suction and discharge.

MANY EXCLUSIVE ADVANTAGES

The **CHIKSAN** Hose, when used as shown, saves time, labor and expense, as well as dock space, and permits free movement of other equipment.

CHIKSAN Marine & Barge Hose, being made of metal, is not affected by severe climatic conditions or by petroleum products which may cause other hose to deteriorate rapidly. For the same reason, this all-metal hose is not subject to kinking, crushing or cutting—thus outlasting other hose.

CHIKSAN Marine & Barge Hose can be supplied in any required length and size, with end connections as specified, in either aluminum or steel, for above-surface or underwater service.

CHIKSAN TRADE MARK REG.

CHIKSAN COMPANY
AND SUBSIDIARY COMPANIES
Chicago 3, Ill. BREA, CALIFORNIA Newark 2, N. J.
WELL EQUIPMENT MFG. CORP. HOUSTON 1, TEXAS
CHIKSAN EXPORT CO. BREA, CALIFORNIA NEWARK 2, N. J.

WRITE FOR COMPLETE CHIKSAN CATALOG

REPRESENTATIVES IN PRINCIPAL CITIES
SOLD BY LEADING SUPPLY STORES EVERYWHERE

DEAN BROTHERS PUMPS INC. INDIANAPOLIS, IND. STEAM PUMPING MACHINERY

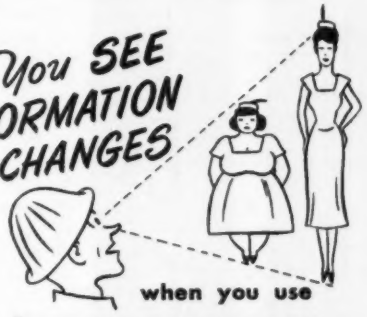
PUMPS

CENTRIFUGAL
RECIPROCATING
BUILDERS OF OUTSTANDING PUMPS
Since 1869

ESTABLISHED 1869

DEAN BROTHERS PUMPS INC.
INDIANAPOLIS IND.
323 W. TENTH ST.

You SEE FORMATION CHANGES



when you use

GEOLOGRAPH

Yes — you actually SEE formation changes, automatically recorded on Geolograph charts foot by foot, as you drill! You get up-to-the-minute, accurate drilling data 24 hours a day. That's why you save when you log as you drill, with Geolograph!

GEOLOGRAPH
MECHANICAL WELL LOGGING SERVICE
P.O. Box 1291 • Oklahoma City 1, Okla.

ABILENE, HOUSTON, ODESSA, LUBBOCK & WICHITA FALLS, TEXAS
BAKERSFIELD, CALIF. — SHREVEPORT & BATON ROUGE, LA.
CASPER, WYOMING — OKLAHOMA CITY, OKLA.

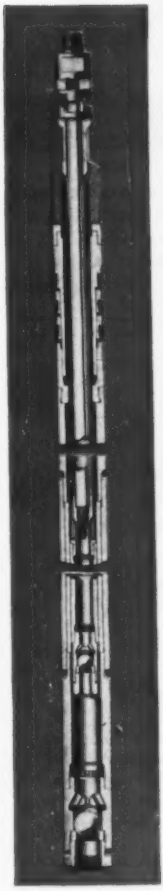
for Economical Production

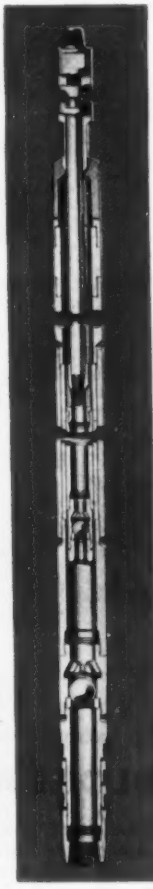
INSTALL

Pacific

Precision Built

PLUNGER PUMPS IN YOUR OIL WELLS





Our job is to provide for you a plunger pump that will insure maximum economy in producing your oil wells. In field after field, Pacific's quality materials coupled with Pacific's precision workmanship have reduced production costs as much as fifty per cent.

This economy is made possible by:

1 Pacific's exclusive strong-tough-hard MOLOY® LINERS for long life, greater resistance to temperature-corrosion-abrasion.

2 PLUNGERS CHROME PLATED then PACILITED — another Pacific exclusive.

3 VALVES AND SEATS to fit well conditions.

4 INTERCHANGEABILITY OF PARTS — all parts of Types RLA and RLB pumps are interchangeable.

5 TWO BUSHINGS will convert Type RLA to Type RLB, or Type RLB to Type RLA.

PACIFIC PRECISION BUILT PLUNGER PUMPS IN YOUR WELLS INSURE ECONOMICAL PRODUCTION.

▲ TYPE RLB

◀ TYPE RLA

Pacific Pumps inc.

ONE OF THE DRESSER INDUSTRIES

PACIFIC *Precision Built* PUMPS

HUNTINGTON PARK, CALIFORNIA

Export Office: Chanin Bldg., 122 E. 42nd St., New York — *Offices in all Principal Cities*

MID-CONTINENT DIVISION: 1221 E. 1st St., Tulsa, Oklahoma

DISTRIBUTED IN CANADA BY: W. A. R. McGaw, 12525 — 72nd St., Edmonton DW-5

Hedge 1 Roark, NW SE NE 3-1n-9w, dry, TD 3,276 ft.

Woodward County: Signal Oil & Gas 1 Bradshaw, NW NW SW 27-22n-17w, dry, TD 9,524 ft.

Appalachian-Ohio

Columbian Carbon Brings In Large Big Lime Gas Well

PITTSBURGH — A large volume of gas was struck in Magnolia district, Mingo County, West Virginia. Columbian Carbon Co. 1-1171 Thacker Land Co. was completed gaging 16,817,000 cu. ft. of gas in the Big lime. The top of the sand was 2,255 ft. with total depth at 2,545 ft. In Buffalo district, Putnam County, Diamond Gas Co. 1 Diamond Alkali tested 1,164,000 cu. ft. of gas in the Brown shale; total depth was 3,838 ft. In Beaver Pond district, Mercer County, United Fuel Gas Co. 1-6478 A. W. Hicks, elevation 2,834 ft., topped the Oriskany sand at 8,053 ft. with a show of gas at 8,038 ft., and is fishing at this depth. In Williamsburg district, Greenbrier County, The Texas Co. is cleaning out 1 G. R. Dean, elevation 2,575 ft., which was completed at a depth of 8,120 ft. through the Tuscarora sand. The well is on the White Sulphur Springs Quadrangle and was drilled several years ago with rotary tools. The Oriskany sand was logged at 6,536-72 ft. with a slight show of gas, and the Clinton sand from 7,728-37 ft.

Maryland.—In Garrett County, New York State Natural Gas Corp. 2-N-247 John K. Shaw, elevation 2,438 ft., found the Onondaga at 3,773 ft., chert at 3,790 ft., had a show of gas at 3,818 ft., and is drilling at 3,824 ft. Mid-Atlantic Oil & Gas Co. 1 J. C. Laschorn, elevation 2,546 ft., had the Onondaga 5,045 ft., chert at 5,068 ft., and is drilling at 5,091 ft. George Jackson 1 A. M. Calhoun, elevation 2,391 ft., is fishing at 3,571 ft.; gas was encountered in the Oriskany sand at 3,560-3,562 ft., testing 151,000 cu. ft. Blaho Oil & Gas Co. 1 Dorcie Rumer, elevation 2,490 ft., is drilling at 3,875 ft.; it reported the chert at 3,810 ft., show of gas from 3,842-3,860 ft. Clarksburg Gas Co. 1 T. W. Ashby is casing at 3,516 ft. Eberly & Snee 2 Gordon is shut down at 3,791 ft. to case.

Southwest Pennsylvania.—In South Buffalo Township, Armstrong County, Pittsburgh Plate Glass Co. 2-839 Mary A. McGinley, elevation 1,153 ft., is drilling again and is at 6,859 ft. In Napier Township, Bedford County, South Penn et al-Snee & Eberly 1 Jesse B. Miller, elevation 1,666 ft., is drilling at 8,924 ft. In Unity Township, Westmoreland County, Peoples Natural Gas Co. 1-4003 A. J. Dotterway, elevation 2,094 ft., is reaming at 2,108 ft.

OHIO

COLUMBUS—Dun-Marr Oil Co. extended an old pool in Fallsbury Township, Licking County, at 3-C W. E. McDonald, Section 21. The Clinton sand at 2,840-92 ft. had a good oil showing, natural, and made 50 bbl. in 24 hours after a 120-qt. shot.

National Gas Co., offsetting oil production in Pike Township, Coshocton County, brought in a good gas well on 3 Dorothy Rine, Section 4. The Clinton was topped at 2,967 ft., and drilling stopped at 4 ft. in when the well gaged 950,000 cu. ft. of gas, natural. The same company also completed another producer in their small pool in Walnut Township, Fairfield County. On 6 J. S. Holliday, Section 14, the Newburg was topped at 1,974 and drilled 10 ft. in. The well made 38 bbl. of oil, natural, and 75 bbl. in 24 hours after shot.

Two fairly good Berea sand producers were completed in Perry Township, Ashland County. J. W. Goetz et al. 7 Ellen Smalley, Section 3, made 18 bbl. after shot from sand at 665-792 ft. N. T. Shorts et al. 2 George M. Brettin, Section 9, made 22 bbl. after shot from sand at 706-728 ft.

California

New Deep-Field Discovery Registered at Oat Mountain

LOS ANGELES.—A new deep field discovery has been registered at Oat Mountain, about 1 mile northwest of the Aliso Canyon field near the Los Angeles-Ventura County line. The discovery well was Edwin W. Pauley 36 Blow, completed in about 50 ft. of oil sand at 9,300 ft. for a 400-bbl. pumper. The field is believed to be entirely separate from the Aliso Canyon structure.

Located in Section 19-3n-16w, the wildcat originally was Standard Oil Co. of California 101 Wigdal. As such it was completed in May 1946 as a 300-bbl. producer at 9,325-75 ft. and abandoned in November 1947. Early this year Pauley redrilled the well to the sand, cutting a new hole from below 2,300 ft. Difficulties were encountered, however, so that the well again was redrilled from about 2,600 ft.

Drilled from a surface elevation of 3,610 ft., the well is believed to be the highest producing oil well in California. Because of the rugged terrain, and extreme lost-circulation problems, development is expected to proceed slowly. The operator believes the discovery may be of major importance, and that future drilling will show the well to be on the flank of the structure.

The new Castaic Hills discovery, about 10 miles north, now has four extension tests under way which will shortly give an idea of that field's importance. Continental Oil Co. et al 2 Rynne-Fisher, a west offset to the 4,600-ft. discovery, was near the pay zone. About ¾ mile southeast in Section 36-5n-17w, The Texas Co. 1 Honor Rancho-2 was nearing 1,500 ft.; and about 1 mile west of the discovery in Section 34, its 1 Stanley was below 2,000 ft. Two locations south of the discovery Richfield Oil Corp. was preparing to spud its 83-35 Golden.

Nearby Castaic Junction, 4 miles south of Castaic Hills, continues to grow in importance. Humble Oil & Refining Co., sole operator in the field, at its recently completed 6 Newhall Land & Farming picked up a new 120-ft. oil sand about 1,000 ft. below the upper 9,000-10,000-ft. oil zone. Although the well was completed in the still-deeper oil-condensate zone at 11,732-11,810 ft., the new pay appeared to be the best of the three zones. The 8 N.L.&F., a south offset to 6, is scheduled to be completed in the new zone.

In the San Joaquin Valley region two extension tests were in the process of completion. About 1 mile northwest of Texaco's North Arvin discovery the company was completing 1 Kern Valley as a pumper. Located in Section 15-31s-29e, the wildcat was bottomed at 6,320 ft. with 12-in. tubing hung at 6,275 ft.

On the western side of the valley, Ohio Oil Co. was completing 1 Tulare fee as a ½-mile northwest extension to the Belgian Anticline field. With 5½-in. casing bottomed at 6,969 ft., a 3½-hour test resulted in the well producing 51°-gravity condensate at the rate of 150 bbl. daily from 10 perforated intervals in the Oceanic and Point of Rocks sands at 6,144-6,969 ft. No production was obtained from the Oceanic (topped at 6,056 ft.) on this test, so additional perforations were made at 6,045-75 ft. On a second test of this section one joint of tubing collapsed.

Oregon.—In Douglas County, Oil Developers, Inc., was reported drilling below 800 ft. at 1 Leonard-Lile, a "no-dope" wildcat. Location is in SE SE Section 27-25s-7w. The rig being used has an 8,000-ft. drilling capacity.

CALIFORNIA SUCCESSFUL WILDCAT

Los Angeles County, new field discovery at Oat Mountain: Edwin W. Pauley 36 Blow (was Standard Oil Co. of California 101 Wigdal), NE SW 19-3n-16w, IP pumped 400 bbl. of 20°-gravity crude daily, perf. 9,300-68 ft., old well re-

SHIELD *of* MODERN FIRE PROTECTION

TRADE MARK
C-O-TWO
REG. U.S. PAT. OFF.

"headquarters for the finest"

Foremost design, experienced engineering, quality materials, expert workmanship and operating superiority are all bywords of the C-O-Two Fire Equipment Company . . . originators of the world famous C-O-TWO Squeez-Grip Carbon Dioxide Type Fire Extinguishers.

C-O-TWO, being specialists in modern fire detecting and extinguishing equipment for many years, are constantly striving to develop new and improved types of fire protection equipment that will render highly efficient results in safe-guarding life and property from the ravages of fire.

With C-O-TWO Fire Protection Equipment, simplicity, practicability, longevity and minimum maintenance are built-in features that guarantee fast, positive action the instant fire strikes. Furthermore, extensive skill and high quality standards, together with approvals such as the Underwriters' Laboratories, Inc., Factory Mutual Laboratories, Armed Forces and Government Bureaus assure you of the finest in modern fire protection equipment.

Among the many types of up-to-date fire protection equipment manufactured by C-O-TWO, the following comprise the principal items on the market today:

- **carbon dioxide type hand and wheeled portable fire extinguishers**
- **dry chemical type hand and wheeled portable fire extinguishers**
- **carbon dioxide type hose rack and hose reel fire extinguishing units**
- **built-in high pressure carbon dioxide type fire extinguishing systems**
- **built-in low pressure carbon dioxide type fire extinguishing systems**
- **built-in smoke fire detecting systems**
- **built-in heat fire detecting systems**
- **high pressure carbon dioxide cylinder recharging equipment**

So, with current expensive delayed replacements, why not let an expert C-O-TWO Fire Protection Engineer help you now in planning modern, economical, fully approved fire protection facilities for your various properties. Our experience is at your disposal . . . no obligation of course. Get the facts today!

C-O-TWO FIRE EQUIPMENT COMPANY

NEWARK 1 • NEW JERSEY

Sales and Service in the Principal Cities of United States and Canada

Affiliated with Pyrene Manufacturing Company

MANUFACTURERS OF APPROVED FIRE PROTECTION EQUIPMENT

Squeez-Grip Carbon Dioxide Type Fire Extinguishers • Dry Chemical Type Fire Extinguishers
Built-In High Pressure and Low Pressure Carbon Dioxide Type Fire Extinguishing Systems
Built-In Smoke and Heat Fire Detecting Systems

FOR SAFE • DEPENDABLE LIFTING ON ALL OIL FIELD JOBS

GIVE ME

DUFF-NORTON Hy-Power Hydraulic JACKS

If smooth, fast, easy lifting and lowering are important to you . . . you will profit by standardizing on Duff-Norton Hy-Power Hydraulic Jacks. Capable of being used in both vertical and horizontal positions, these jacks have the all-around versatility you need. In the Duff-Norton Hy-Power line you'll find the correct sizes too: capacities from 3 to 50 tons . . . closed heights from 4½ to 11 inches . . . lifting heights from 2 to 7¾ inches.

These jacks are ruggedly built to give long service under the most severe working conditions. You'll find them real time and money savers on every lifting and lowering job.

Duff-Norton Jacks include hydraulic, ratchet, screw and air motor power models, in capacities ranging from 3 to 100 tons.

Write for Bulletin AD 16-U, which describes and illustrates Hy-Power Hydraulic Jacks.

See your Local Distributor

THE DUFF-NORTON MANUFACTURING CO.

MAIN PLANT and GENERAL OFFICES, PITTSBURGH 30, PA.—CANADIAN PLANT, TORONTO 6, ONT.

"The House that Jacks Built"

drilled from 2,600 ft., old TD 9,525 ft., new TD 9,368 ft., elev. 3,610 ft.

CALIFORNIA WILDCAT FAILURES

Kern County, Dagney Gap area: N. B. Cramer 2 Cramer-Independent, 3-25s-18e, dry, TD 898 ft., elev. 597 ft.

Mount Poso area: Bradford Bishop 2-9 Glide 23, 23-27s-28e, dry, TD 1,300 ft.

Salt Creek area: Western Petroleum Co. 35 Ferguson-Western, 30-29s-21e, dry, TD 1,550 ft.

Temblor area: Cal-Air Petroleum Corp. 1 Sun Crest, 26-29s-20e, dry, TD 1,703 ft., elev. 1,670 ft.

Wible area: Western Gulf Oil Co. 81-13 Castro, 13-30s-27e, dry, TD 7,800 ft., elev. 375 ft.

Los Angeles County, Montebello area: The Texas Co. 1 City of Passadena, 6-2s-11w, dry, TD 7,680 ft., elev. 200 ft.

Santa Fe Springs area: St. Anthony Oil Corp. 2 Barley, 32-2s-11w, dry, TD 4,294 ft., elev. 168 ft.

Saugus area: Humble Oil & Ref. Co. D-3 N.L.&F. Co., 9-4n-16w, dry, TD 1,389 ft., elev. 1,156 ft.

Mississippi

Wayside Field Discovery Potentials 160-Bbl. Daily

JACKSON. — Final completion has been made on the discovery well for the new Wayside field, Adams County, at Magnolia Petroleum Co. 1 Netterville-Kendall Unit, 12-5n-1w. From the Wilcox at 6,496-99 ft., the well was potentialed for 160 bbl. of 42° gravity oil daily through 10/64-in. choke. Tubing pressure was 375 psi., and casing pressure 450 psi. Electric log and side-wall cores indicated 7 ft. of oil sand in the one from which the well was completed, and an additional 6 ft. in a lower zone topped at 6,539 ft., which was not tested.

Barnett Serio's 1 McGehee-McGehee & Ford, 30-5n-3w, wildcat approximately 1¼ miles southwest of Glen Aubin field, was completed dry. Side-wall cores and electric log indicated show of oil in the Wilcox at 6,561-65 ft. with salt-water sand immediately below the show. Casing was run, and operator perforated at 6,554-55 ft. and 6,565-66 ft. for block squeeze. Perforations were then made at 6560-61 ft. for drill-stem test. Recovery from 6¼-hours test was 500 ft. of water cushion, 30 ft. of oil, and 6,000 ft. of salt water. A second completion attempt was made at 6,559½-60½ ft., and on 5¾-hour drill-stem test, recovery was 510 ft. of water cushion, 15 ft. of oil, and 6,000 ft. of salt water.

In Franklin County, approximately 4 miles northeast of the new Freewoods field, Hunt Oil Co. squeezed perforations at 6,465-69 ft. in 1 U. S. A., 30-5n-2e, and reperforated same interval. At last report, the well was flowing into pits, being 20 per cent oil and 80 per cent wash water. This wildcat has 7-in. casing cemented at 6,456 ft., and there has been some doubt as to the effectiveness of the cement job on 5½-in. liner. Oil shows were reported in the Wilcox at 6,465-74 ft.

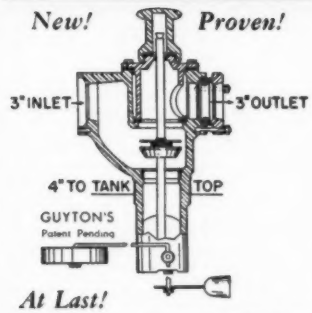
In northeastern Wilkinson County, approximately 3½ miles west and slightly north of Freewoods field, Max B. Andrea-L. Cashion Co. 1 Hazlip, et al, 10-4n-1e, also encountered completion difficulties. Casing was run to 6,590 ft., and operators perforated 6,455-56 ft. and 6,457½-58½ ft. and squeezed. Casing was then perforated 6,456-57½ ft. for test. Tubing was run, and well was swabbed to within 200 ft. of bottom. No report has been made on completion attempt.

MISSISSIPPI SUCCESSFUL WILDCAT

Adams County: Oil discovery "Wayside field"—Magnolia Petroleum Co. 1 Netterville-Kendall Unit, 12-5n-1w, TD 7,515 ft., Wilcox 6,496-99 ft., IP: 160 bbl. oil

PERRAULT
FIBER-CAST
THERMO-SET PLASTIC PIPE
REINFORCED WITH GLASS FIBERS
FOR
THE OIL INDUSTRY
THE GAS INDUSTRY
FRESH WATER SYSTEMS
SALT WATER SYSTEMS
"Everything for the Pipeliner"
★
PERRAULT Brothers
1130 NO. BOSTON,
TULSA, OKLA. • 5-1103
Export Office:
30 ROCKEFELLER PLAZA
NEW YORK, N.Y.
CIRCLE 6-6260

SAVE MANY WAYS
with this new
revolutionary
STOCK TANK
ROUTING VALVE



At Last!

Here is a new poppet type Routing Valve that is set manually—and switches flow from tank to tank AUTOMATICALLY. Any tank in the battery can be by-passed WITHOUT SETTING THE VALVE.

Write For Complete Bulletin!

MURDOCK
TANK & MFG. CO.
TULSA, OKLAHOMA, U. S. A.

per day, 42° gravity, 10/64-in. choke, TP 375 psi., CP 450 psi.

MISSISSIPPI WILDCAT FAILURES

Adams County: Humble Oil & Refining Co. 1 R. L. Emery, Jr., 60-6n-1w, dry, TD 7,010 ft.

Barnett Serio 1 McGehee - McGehee & Ford, 30-5n-3w, dry, TD 7,212 ft.

Neshoba County: Pure Oil Co. 1 J. D. Jones, 19-11n-13e, dry, TD 5,610 ft.

Wayne County: C. H. Wansley 1 Masonite Corp., 21-9n-7w, dry, TD 5,205 ft.

Wilkinson County: Gulf Refining Co. 2 Crosby Lumber Co. 25-3n-2w, dry, TD 7,389 ft.

Texas Gulf Coast

Shell Establishes Eighth Pay for Clam Lake Field

HOUSTON.—New pay has been established in Clam Lake field, Jefferson County, at Shell Oil Co. 24 McFaddin Trust, Sarah A. Pace Survey, Abstract 783. From perforations at 4,752-60 ft., the well flowed 173 bbl. of 28°-gravity oil daily through 9/64-in. choke. Tubing pressure on potential test registered 650 psi., and casing pressure 775 psi. This brings the total to 8 pay horizons in Clam Lake ranging from the 2,350-ft. level to 6,650 ft.

Potential test has been run at Sunray Oil Corp. 1 W. A. Smith, discovery well for Sheriff Smith field, Live Oak County. From perforations in the Mackhank at 1,030-40 ft., the well produced on gas lift 53 bbl. of pipe-line oil daily through ¼-in. choke. Hole is bottomed at 7,548 ft. with 5½-in. casing set 1 ft. off bottom. This well showed for gas and condensate in the Slick-Carrizo at 6,647-59 ft. and 6,704-17 ft., as well as the Luling at 6,793-6,803 ft. The new discovery is located 1½ miles north of Northeast Goebel field.

Tex-Harvey Oil Co. 1 Robert Winkelmann, Washington County wildcat 4½ miles north of Brenham, is drilling below 11,802 ft. Operators encountered a 30-ft. oil sand around the 8,000-ft. level and are reported to have had another at an undisclosed depth. Original contract was for 10,000 ft.

A new discovery for Chambers County is indicated at Standard Oil Co. of Texas 1 W. F. Gaw, wildcat located approximately 9 miles southeast of Anahuac. Operators have set 7-in. casing at 8,385 ft. and are waiting on cement. Hole was drilled to 9,047 ft., and electric log run to bottom. After analysis of electric log, side-wall samples were taken, followed by side-wall cores in the Frio.

The Texas Co. has set production string and is preparing to perforate for production tests at 1 Mrs. Ethel M. Beckenhauer, wildcat just northwest of Francitas field in Jackson County. Hole is bottomed at 8,000 ft. and has 5½-in. casing cemented to 7,993 ft.

TEXAS GULF COAST (DISTRICTS 2 AND 3) SUCCESSFUL WILDCATS

Fort Bend County: New pay at Blue Ridge—John Mitchell, et al, 1 Evans, ETRR Sur., Sec. 1, TD 7,908 ft., Vicksburg 7,841-46 ft., IP: 105 bbl. oil per day, 28° gravity, TP 800 psi.

Jefferson County: New pay at Clam Lake—Shell Oil Co. 24 McFaddin Trust, Mrs. Sarah A. Pace Sur., A-783, TD 6,620 ft., perf. 4,752-60 ft., IP: 173 bbl. oil per day, 9/64-in. choke, 28° gravity, TP 650 psi.

TEXAS GULF COAST (DISTRICTS 2 AND 3) WILDCAT FAILURES

Bee County: Rudco Oil & Gas Co., et al, 1 A. J. Kimball, Henry Coley Sur., A-138, dry, TD 7,573 ft.

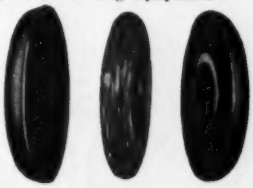
Brazoria County: John H. Blaffer & Federal Royalty Co. 1 Shell Oil Co., Sec. 28, S. F. Austin Sur. 9, A-25, dry, TD 8,500 ft.

Humble Oil & Refining Co. 2 Rattlesnake

Ole Gyrol says-

"With adjustable speed Gyrol Fluid Drives, smooth acceleration of the load is obtained without danger of stalling the engine."

Protect your investment, save time and money — Specify American Blower Gyrol Fluid Drives on your oil drilling equipment.



AMERICAN BLOWER CORP., DETROIT 32, MICH.
CANADIAN SIROCCO CO., LTD., WINDSOR, ONT.
Division of AMERICAN RADIATOR & Standard Sanitary corporation

Serving home and industry
AMERICAN-STANDARD • AMERICAN BLOWER
CHURCH SEATS • DETROIT LUBRICATOR • KEWANEE BOILERS
ROSS HEATER • TONAWANDA IRON

RUGGED— ACCURATE— EFFICIENT!

#3480
100 C.C.
CENTRIFUGE

You can maintain your required speed for the full period of the test with much less effort. Curtin centrifuges, proven world-wide, are heavy duty, rigidly constructed, and extremely simple in design. Illustrated bulletin, giving full details, available upon request.

W·H·CURTIN & CO.
HOUSTON . . . NEW ORLEANS.

IN A CLASS BY ITSELF...

COMPLETELY DRILLABLE
You will never have to "mill up" a Baker Retainer Production Packer.

NO "SET-DOWN" WEIGHT REQUIRED
When desired the tubing can be suspended in tension to avoid "corkscrewing."

RESISTS CORROSION
Cast iron construction of the packer is more corrosion resistant than steel casing.

HOLDS BOTH WAYS
Two full sets of opposing slips prevent downward or upward movement of packer.

CLEAR PASSAGE THRU PACKER
for "down-hole" work. Flapper type back-pressure valve opens readily and closes positively.

MANY APPLICATIONS
including two-zone, single-zone, testing, acidizing, re-pressuring, gas lift, etc., are possible with . . .

PACKER IS FREE FROM TUBING
and is practically part of casing. Vertical movement of tubing is unrestricted.

EFFICIENT ACCESSORY EQUIPMENT
as described and illustrated in the BAKER CATALOG and the Composite Catalog.

Product No. 415-D

BAKER

RETAINER PRODUCTION PACKER

No. 2 of a Series

CASE HISTORIES
of Houston Ready-Cut Installations

Shell Oil Company's TXL Gasoline Plant Camp Site at No Trees, Texas—A total of 23 units were completed at this camp by Houston Ready-Cut House Co. Materials were delivered, construction begun and finished, turnkey, exactly on schedule all under the careful supervision of our own crews. Homes are comfortable, attractive and well-constructed for years of use.

IMMEDIATE DELIVERY
anywhere in the world

What are YOUR Needs?

★ 1 HOUSE OR 100

★ INDIVIDUAL UNITS, OFFICE BUILDINGS OR DORMITORIES

★ ERECTED COMPLETE OR FOR ERECTION BY YOUR CREWS

FREE SURVEY - phone or wire for a personal survey and estimate *without obligation.*

HOUSTON Ready-Cut HOUSE CO., Inc.
Prefabricated Housing for Industry Since 1917
P. O. BOX 124 HOUSTON 1, TEXAS

Mound, State West Bay, in West Bay, 13 mi. SE of Danbury, dry, TD 7,510 ft.

Chambers County: Frank W. Michaux 1 William Meithen, Andrew Weaver Sur., A-311, dry, TD 7,010 ft.

Fayette County: Hammon Oil & Royalty Co. 1 M. V. Harris, John F. Berry League, A-16, dry, TD 6,810 ft.

O. A. Neatherly, Jr., 1 Ida French, Adam Zulwalt Sur., A-118, dry, TD 2,011 ft.

Goliad County: Plymouth Oil Co. 1 Ivy Bell Peck, Daniel Gilmartin Sur., A-131, and John Griffith Sur., A-133, dry, TD 9,011 ft.

Liberty County: Sohio Petroleum Co. 1 A. E. Davitt, et al, William Donaho League, A-26, dry, TD 8,605 ft.

Live Oak County: H. H. Presnall 1 Charles H. Burns, James L. Vaughn Sur. 57, A-467, dry, TD 1,600 ft.

Wharton County: A. W. Cherry, et al, 1 Sam Bishkin, ETRR Sur., A-140, dry, TD 5,575 ft.

The Texas Co. 1 J. F. D. Moore, George Huff Sur., A-30, dry, TD 11,464 ft.

Kansas

Graham County Tests Open Three New Pools

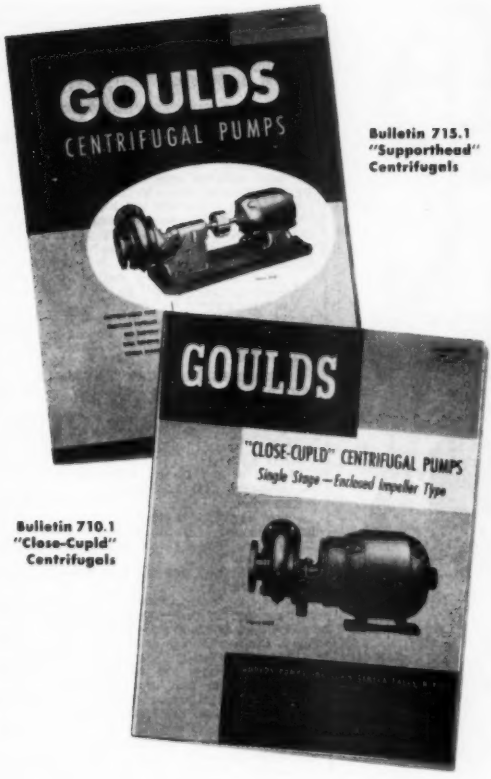
INITIAL tests at Prime Drilling Co.'s rank wildcat in the extreme western part of Graham County indicate an exceptional promising oil discovery. The well, 1 Stober, SW SW NW 1-9-25, swabbed at the rate of 12 bbl. of oil per hour before acidizing. While cleaning out after acidizing, it made 60 bbl. the first hour. Pay zone is the Lansing-Kansas City lime section with casing perforated at 4,013-17 ft. Lansing top was checked at 3,838 ft. (—1,316 ft.). Total depth is 4,058 ft., where casing is cemented. Location is 3 miles south of Morland. Nearest production is in the Penokee area, 7 miles northeast.

Another Graham County wildcat, Peel & Hardman 1 Legere, NW NW SE 21-8-23, 3 miles southwest of Hill City and 10 miles northeast of Prime Drilling Co.'s well, also is showing for a good producer. Testing the Lansing-Kansas City section, opposite which casing first was perforated at 3,781-89 ft., it swabbed 10 bbl. of oil per hour. With casing perforated at 3,761-67 ft., it swabbed 30 bbl. of oil per hour for 2 hours, and then made 10 bbl. of oil per hour for 12 hours. Top of the Lansing is 3,572 ft. (—1,325 ft.). Hole had been drilled to the Arbuckle, logged at 4,057-80 ft., but failed to show for commercial production in that pay.

Three miles northeast of Hill City and 6 miles northeast of the Peel & Hardman well, in the same county, another wildcat, Morris Sitrin and Murfin Drilling Co. 1 Morris, SE SE SE 32-7-22, swabbed 120 bbl. of oil in 1½ hours while testing Lansing-Kansas City lime. Casing, bottomed at 3,761 ft., is perforated at 3,597-3,600 ft. Lansing top is 3,413 ft. Arbuckle lime, topped at 3,759 ft. and drilled to 3,776 ft., tested only a small showing. Location is 4 miles north of the Highland pool, nearest production.

Northern Rush County has come up with an indicated oil pool discovery where Sam Kelinson and associates have cemented casing to test their 1 Pfeifer, NW NW NW 6-16-17. Nearest production is in Schoenchen pool, 4 miles to the northwest in Ellis County. Bottom of the hole is at 3,512 ft. in Reagan sand, topped at 3,502 ft. (—1,603 ft.). Oil showings were found not only in the Reagan sand, but also in the Arbuckle, topped at 3,447 ft. (—1,548 ft.), and the Lansing-Kansas City, topped at 3,198 ft. (—1,299 ft.). Best showings were in the latter section, from which, in a 30-minute drill-stem test at 3,44-69 ft., the well filled 1,675 ft. with oil. The test had gas at the surface in 2 minutes. Casing is bottomed 2 ft. in the Reagan sand.

Francis Oil & Gas Co. 1 Fischer, SW SW NW 5-11-20, prospective new pool opener in northwestern Ellis County, swabbed 2¾ bbl.



Bulletin 715.1
"Supporthead"
Centrifugals

Bulletin 710.1
"Close-Cupld"
Centrifugals

These new bulletins make it easier for you to select the right pump

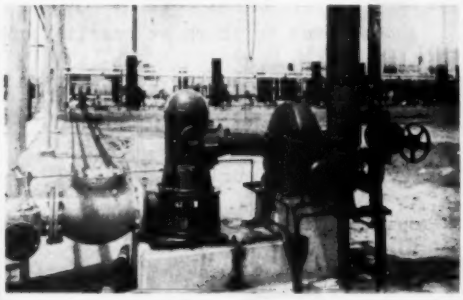
These new bulletins have been designed to help you. New sizes are listed, and, in each bulletin we have put a composite rating chart which includes both "Close-Cupld" and the supporthead. This makes it dead simple to put your finger on the right pump for your requirements.

Another valuable feature of these bulletins is the parts chart. Using this you see exactly what parts are interchangeable for all size pumps and so can keep your spare parts investment to a minimum.

Send for these useful FREE bulletins *today*. Goulds Pumps, Inc., Seneca Falls, N. Y.

Goulds PUMPS INC. Seneca Falls New York

Cooling Tower Service



A "Natural" For The JOHNSON Right Angle GEAR DRIVE

ECONOMICAL...Use of available steam at 3600 RPM turbine with pump speeds as low as 1200 RPM.

COMPACT.....An extremely compact installation, with simplified piping, is possible through the use of a Johnson Drive and vertical turbine pump.

VERSATILE.....Horizontal electric motors can also be used in conjunction with the Johnson Drive. In the event of motor breakdown, a horizontal motor is usually obtainable for replacement more readily than a vertical motor.

CONTINUOUS OPERATION.....Where uninterrupted service is necessary, Johnson supplies a Right Angle Drive for combination electric motor and steam turbine service.

AVAILABLE.....In a number of sizes and types to meet varied applications.

INVESTIGATE....The Johnson Drive sold through pump manufacturers. Catalog with full engineering data sent on request.

The Johnson Right Angle Gear Drive is in use throughout the world, serving industry at low-operating cost and high efficiency.

JOHNSON GEAR
AND MANUFACTURING CO.
MAIN OFFICE & WORKS • BERKELEY 10 • CALIFORNIA

No doubt You have heard the expression
that Tulsa is the "Oil Capital of the world"
A sentiment to which we heartily subscribe
but in some other Southwestern cities
they hear it and their
hair gets curled....

However, it's a point we don't need to debate
Because we want to relate
That Tulsa - and the FIRST of TULSA
foster lots of industries besides
those related to Black Gold.....

Many, Many, Many more than this paid
advertisement would hold.....
So, while we're best known for our

Successful toil in oil and
businesses related thereto
Our Bank Services include work on all kinds
of Industries, and all the help you'd care to
Have in this area. So if You are interested in
Tulsa industries and for Spavinaw
water have thirst
Let's talk it over-come in-Think...FIRST!

THINK 1st of Tulsa

★ In our Correspondent Bank Department, You should know, Elmo Thompson, Joe Byrd, Harry Lane, Bill McLean, and Dick Wagner.

THE FIRST NATIONAL BANK AND TRUST COMPANY OF TULSA

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

per hour from open hole at 3,680-82 ft., and 5 bbl. per hour from casing perforations at 3,668-72 ft. in Arbuckle lime, topped at 3,666 ft. (—1,601 ft.). Testing continues. Location is 4 miles north of the Nicholson pool, nearest production.

KANSAS SUCCESSFUL WILDCATS

Hodgeman County: Armer-Coplin 4 Schraeder, SE NW NW 3-24s-24w, pumped 3,000 bbl. oil from Sooy conglomerate (Pennsylvanian) at 4,651-60 ft., TD 5,233 ft., new zone in Purdyville.

Phillips County: Coop Refining et al 1 Beckman "A," SW SW SE 3-4s-19w, pumped 22 bbl. oil from Lansing-Kansas City at 3,201-03 ft., 3,206-08 ft., 3,220-22 ft., and 3,243-47 ft., TD 3,528 ft.

Sumner County: Kanotex 1 Harris, SW SW SE 31-34s-1e, flowed 186 bbl. oil from Simpson at 3,875-84 ft., TD; new zone in Guelph.

Woodson County: Ashlock 1 Schelenger "C," SW SW NE 25-23s-14e, 12 bbl. oil from 1,635-44 ft., TD.

KANSAS WILDCAT FAILURES

Barton County: Alpine 1 Stueder, SE SE SE 36-17s-12w, dry, TD 3,385 ft.

Aladdin-Hannum 1 Keil, NW NW NW 10-10-16s-15w, dry, TD 3,560 ft.

Adair 1 Ratzlaff, SE NE SE 6-20s-13w, dry, TD 3,524 ft.

Murfin et al 1 Denbo, NW NW SE 26-20s-13w, dry, TD 3,589 ft.

Henderson 1 Klepper, SW SW SE 4-9s-11w, dry, TD 3,411 ft.

Butler County: Birmingham & Bartlett 1 Guthrie, SW SW SE 32-23s-4e, dry, TD 2,655 ft.

Gaty 1 Harder, NE SW SE 19-25s-3e, dry, TD 3,227 ft.

Williams et al 1 Jahren, fractional section, 330 ft. from N and 4,290 ft. from E lines 30-25s-8e, dry, TD 2,788 ft.

Chase County: Evans-Jackman 1 Evans, NE NE NE 14-22s-9e, dry, TD 2,641 ft.

Comanche County: Wentworth 1 Price, SE SE SE 4-32s-16w, dry, TD 5,450 ft.

Cowley County: Palmer 1 McEwen, NE SE NW 35-20s-6e, dry, TD 3,007 ft.

Decatur County: Gore 1 Harold, SW SW SW 20-5s-27w, dry, TD 4,600 ft.

Ellsworth County: National Associated Petroleum 1 Stepanek, NW NW SE 32-15s-8w, dry, TD 3,000 ft.

Lyon County: Woods Oil & Gas 1 Weller, SW SW NE 11-17s-10e, dry, TD 3,205 ft.

McPherson County: N. C. R. A. 1 White, NE NW SW 23-18s-1w, dry, TD 2,836 ft.

Pratt County: Iron Drilling-Brooks Hall 1 Hatfield, NW NW NW 26-28s-14w, dry, TD 4,645 ft.

Reno County: Midstates 1 Meyer "A," SE SE SE 9-25s-4w, dry, TD 4,130 ft.

Rooks County: GMR 1 Weisner, SE SE SE 25-10s-18w, dry, TD 3,695 ft.

Saline County: Phillips & Sanderson 1 Leander ,SE SE NE 1-15s-4w, dry, TD 3,668 ft.

Sumner County: Sun Oil 1 Miller, SE SE NE 32-32s-1w, dry, TD 4,430 ft.

Trego County: Cook & Galloway 1 Colborg, SE SE NE 22-14s-21w, dry, TD 4,080 ft.

Eastern Texas

Limestone County Wildcat Gets Gas in Upper Rodessa

DALLAS.—Byrd Oil Corp. 1 A. P. Maddox, Limestone County wildcat, has been completed from the upper Rodessa as a gas discovery. Completion potential was 4,300,000 cu. ft. daily through 20/64-in. tubing choke, with flowing pressure of 1,350 psi. Final perforations were from 5,050-68 ft.

The Woodlawn gas area of Harrison County had another oil well in prospect at Hollandsworth Oil Co. 1 Gladys Davis, ½ mile south of the Woodlawn townsite and an east offset to the same operator's 3 Frank Davis which was an oil discovery.

A test in the upper Pettit through per-

forations at 6,490-6,500 ft. developed a flow of 20 bbl. of 36°-gravity oil an hour through ¼-in. choke. The well flowed at that rate for 12 hours. A test was under way on perforations from 6,580-6,600 ft.

Grayson County gained another deep test this week at Edwin L. Cox 1 Laura Newton, 8,300-ft. wildcat 2½ miles northwest of Sandusky. Location scaled 1,100 ft. from east and 3,400 ft. from north lines of the John Murphy Survey, A-798.

Southwest of Gunter, Pure Oil Co. 1 Earl Selz, William Richards Survey, developed 100 ft. of slightly oil-cut mud and 50 ft. of salt water on a drill-stem test at 3,285-92 ft.

Mid-Continent Petroleum Corp. 2 Susie Martin, offset test to the Sadler-Pennsylvanian discovery, was drilling ahead at 4,760 ft.

EAST TEXAS (DISTRICTS 5 AND 6) WILDCAT FAILURES

Cherokee County: Robert M. Bass 1 L. A. Thrash, R. Howell Sur., dry, TD 4,300 ft.

Nacogdoches County: Benedum Trees Oil Co. 1 Ben T. Wilson, J. I. Y'Barbo Sur., dry, TD 9,505 ft.

North Central Texas

North Extension Assured To Bonita Field Discovery

WICHITA FALLS.—Standard Oil Co. of Texas 1 Roberts, Montague County, was assured of extension production north of the Bonita field discovery. It was drilled into the Caddo lime around 5,696 ft. and into the conglomerate at 5,760 ft. Drill-stem test from 5,764-5,870 ft. had gas in 5 minutes and oil in 23 minutes, which flowed at the rate of 37 bbl. an hour. Following the test, further porosity was drilled between 5,870-85 ft., and sand with oil shows was reported between 5,885-5,900 ft., total depth.

South of the discovery, Standard 1 C. McCall had top of the conglomerate at 5,755 ft. and drilled oil shows from 5,821-27 ft.

Northeast of Montague, Cox Drilling Co. 1 Veretto ran a 2-hour test in sand at 5,078-86 ft., recovering 630 ft. of gas, 120 ft. of salt water, and 60 ft. of oil and gas-cut mud. It was drilling ahead.

P-M Drilling Co. 1 R. Davis Estate, northeast Throckmorton County Caddo discovery, was ready for completion tests. It topped the Caddo at 4,191 ft., set casing at that depth, drilled ahead to 4,204 ft., and drill-stem tested the open section. Full details were not available, but the well was said to have flowed 244 bbl. of oil a day through 10/64-in. choke. Flowing tubing pressure was 420 psi.

Warren Oil Corp. 1 Nora Lee Kee, Jack County discovery 10 miles southeast of Bryson, drilled to 4,650 ft. then plugged back to 2,311 ft. and completed as a pumper. Perforations from 2,255½-57½ ft. developed 55 bbl. of 40°-gravity oil, with no water, on completion potential.

In Knox County, Stanolind Oil & Gas Co. 1-A Myrtle White, 2 miles east of Knox City, recovered 180 ft. of slightly gas-cut mud on an 80-minute test in the Caddo from 5,573-5,600 ft. and was drilling ahead. Top of the Caddo was 5,569 ft.

Stanolind 2-A M. A. Verhalen, D. G. Burnett Survey, squeezed perforations at 4,232-46 and 4,256-60 ft. and was waiting on cement.

Miami Operating Co. 1 B. H. Hunt, J. Garner Survey, was drilling shale at 4,048 ft.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) SUCCESSFUL WILDCATS

Brown County: J. E. Connally 1 Mrs. M. J. Richardson, A. D. Neil 41 Sur., TD 1,132 ft., elev. 1,492 ft., Caddo pay 1,125 ft., pumped 2 bbl. oil.

J. E. Connally 1 Ula B. Stone, B. Morris 202 Sur., TD 1,090 ft., Caddo 1,044-50 ft., pumped 6 bbl. 28°-gravity oil.

Haskell County: E. K. and E. M. Burt 3

Your pumps, sucker rods and drill strings will last a lot longer if you protect the joint threads with 'Bestolife Lead Seal Tool Joint and Casing Compound—standard of the oil country for more than 20 years. Unconditionally guaranteed. Packed in 1¼, 5, 20 and 50 lb. containers. Sold and exported by supply houses throughout the world.

I. H. GRANCELL
1601 E. NADEAU STREET, LOS ANGELES 1, CALIF.

Swenson Bros., 13-1-BBB&C, TD 2,982 ft., pay 2,500-06 ft., flowed 315 bbl. 42°-gravity oil, ¾-in. choke, TP 200 psi., GOR 560 cu. ft.

Rowan & Hope 1 Anna Mae Hutchinson, Arthur Slaydon Sur. 56, TD 5,001 ft., elev. 1,557 ft., pay 4,976 ft., flowed 116 bbl. 39°-gravity oil, 10/64-in. choke, TP 300 psi., GOR 225 cu. ft.

Jones County: R. H. & R. 4 J. C. Williams, Sec. 204, BBB&C Sur., TD 2,057 ft., perf. 1,908-22 ft., flowed 316 bbl. 40°-gravity oil, ¼-in. choke, TP 50 psi., GOR 300 cu. ft.

Stonewall County: Dan Auld 1 C. E. Boyd, 46-D-H&TC, TD 6,043 ft., elev. 1,667 ft., conglomerate pay 6,032 ft., flowed 427 bbl. 41°-gravity oil, ¼-in. choke, TP 500 psi., GOR 872 cu. ft.

Taylor County: Reno Oil Co. 1 Ailene Johnson, Blk. 446, G. W. Denton Sur., TD 4,266 ft., elev. 1,943 ft., perf. 4,219-66 ft., flowed 1,440.8 bbl., 39°-gravity oil, TP 150 psi., 32/64-in. choke, GOR 850 cu. ft.

Throckmorton County: C. H. Kadane 1 Everett, Sec. 1,615, TE&L Sur., TD 4,759 ft., flowed 1,064 bbl. 42°-gravity oil, 14/64-in. choke.

Warren Oil Corp. 1 R. Mathiews, Sec. 670, TE&L Sur., TD 4,375 ft., elev. 1,183 ft., Mississippi lime 4,366 ft., flowed 464 bbl. oil, 16/64-in. choke, TP 680 psi.

Wichita County: Frank Wood 2 Wichita Water Improvement, Robert Evans Sur., A-74, TD 4,469 ft., elev. 1,001 ft., pay 4,327 ft., pumped 57 bbl. 43°-gravity oil, GOR 150 cu. ft.

Young County: J. W. Hastings 1 W. T. Boyle, BBB&C Sur. 1, A-34, TD 3,561 ft., pay 3,508 ft., flowed 72 bbl. 41°-gravity oil, 12/64-in. choke, TP 80 psi., GOR 500 cu. ft.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) WILDCAT FAILURES

Archer County: Archer Drilling & Producing Co. 1 Bell Lease, Blk. 14, C&P Subd., dry, TD 1,099 ft.

Archer Drilling 1 Slaughter Lease, Blk 15, Meades LM Pasture Subd., dry, TD TD 1,451 ft.

Archer Drilling 2 Slaughter Lease, Blk 15, Meades LM Pasture Subd., dry, TD 1,465 ft.

C. B. Christie 1 L. B. Orchard, SPRR Sur 1, A-417, dry, TD 2,876 ft.

Reno Oil Co. 1 L. F. Wilson-Harry, Wilson Geraldine Subd., dry, TD 1,661 ft.

Bob Stack 1 Turbeville, Blk. 69, Jefferson CSL, dry, TD 1,075 ft.

Callahan County: Bashara Bros. 1 Mrs. L. M. Williams, Sec. 60, BOA Sur., dry, TD 1,207 ft.

Mid-Continent Petroleum Corp. 1 Bernard Crow, 46-E, Mather-226 Sur., dry, TD 4,351 ft., elev. 1,873 ft., Caddo 3,300 ft., Ellenburger 4,160 ft.

Clay County: L. T. Burns 1 Della Keen, Sec. 2,699, TE&L Sur., dry, TD 4,606 ft.

Ted A. Norwood 1 J. B. Dunn, Blk. 19, Byers Bros. Subd., dry, TD 1,980 ft.

Coleman County: Haynes B. Ownby Drilling Co. 1 J. P. McCord, J. H. Gibson Sur., dry, TD 4,034 ft.

Jack County: R. B. Farris 1 W. M. Johnson, E. Smith Sur., A-524, dry, TD 3,678 ft.

Jones County: Iowa-Payne Oil Co. 1 F. J. McDonald, Sec. 73, DeWitt CSL, dry, TD 4,607 ft.

Jones & Stasney 1 J. B. Schoomaker, Sec. 45, D&DAL, dry, TD 3,137 ft., reef 3,077 ft.

Ungren & Frazier 1 Ina Mae Stanton, Lge. 356, Subd. 2, I. DeLaGarza Sur., dry, TD 3,150 ft.

Montague County: Konrad Sztykgold 1 Walter R. Hodges, Blk. 63, Kaufman CSL, dry, TD 4,986 ft.

Shackelford County: G. A. Hughes and H. W. Lee 1 J. P. Morris, Sec. 188, ETRR Sur., dry, TD 1,320 ft.

J. H. Van Zant et al 1 Roma Manley, 28-14-T&P, dry, TD 1,718 ft., Dotham 1,265 ft.

Stonewall County: Continental Oil Co. 1 C. S. Springer, 20-F-H&TC, dry, TD 6,948 ft., elev. 1,915 ft., Canyon reef 4,993 ft., Caddo 6,420 ft., Mississippian 6,518 ft., Ellenburger 6,775 ft.

Wichita County: Perry Browning 1 H. Sanders, Blk. 66, Red River Valley Land Subd., dry, TD 1,808 ft.

W. H. Hammon 1 G. W. Graham, E. Morrison Sur., dry, TD 6,067 ft.

Young County: Jack Grace Drilling Co. 1 B. W. King, Sec. 1,920, TE&L Sur., dry, TD 4,330 ft.

Tom B. Medders 1 Carrie B. Reckman, Blk. 2,389, TE&L Sur., dry, TD 735 ft.

Panhandle Producing & Refining Co. 1 Mrs. E. E. Hughes, W. J. Hughes Sur., A-1,447, dry, TD 4,551 ft., elev. 1,220 ft., Caddo 3,386 ft.

FISHIN'S much FASTER
WITH A
LEBUS
KNUCKLE JOINT
OVERSHOT SYSTEM
The LeBus Knuckle Joint—Overshot System is so efficient that by running the knuckle Joint above the Overshot on every fishing job, you are able to contact the fish quickly and at a minimum of expense. The FO-47 Knuckle Joint will help the Overshot Guide contact the fish quickly on the first run which is insurance against expensive cutting jobs. The cost of cutting a string of stuck pipe is often more expensive than the entire cost of one LeBus FO-47 Knuckle Joint. Have the LeBus Knuckle Joint always available on your derrick floor, and your regular driller becomes an expert fishing tool operator.
LESS EXPENSIVE
MORE EFFECTIVE
WRITE TODAY FOR
COMPLETE LITERATURE
LEBUS
LEBUS ROTARY TOOL WORKS
P. O. BOX 2352 LONGVIEW, TEXAS L. D. Phone 5

South Louisiana

Humble Tests Prospective Terrebonne Parish Discovery

NEW ORLEANS.—Humble Oil & Refining Co. is testing its prospective discovery in the Bayou Jean la Croix area of Terrebonne Parish, 1 Louisiana Land & Exploration Co. "D." Exact depth of perforations has not been disclosed by operator. Hole is bottomed at 13,678 ft. with 5½-in. liner set at this point.

Sinclair Oil & Gas Co. has conducted three drill-stem tests at 1 Turner Lumber Co., 29-2s-6e, Avoyelles Parish. The well flowed 11,470 ft. of salt water and 180 ft. of distillate from perforations at 11,814-26 ft. These perforations were squeezed and well was reperforated at 11,812-20 ft., and recovery was salt water. From perforations at 11,817-29 ft., recovery was 1,500 ft. of salt water.

Coring operations are under way at a Rapides Parish wildcat, Texas Pacific Coal & Oil Co., et al, 7 C. H. Fisher, 33-3n-5e. Operator cored sand and shale from 7,609-51 ft. Core from 6,695-6,709 ft. also re-

vealed no shows. Coring is continuing below 6,709 ft.

The Texas Co. has taken side-wall samples at 1 Isabel Crawford Logan, 4-3s-10w, Beauregard Parish wildcat in the Pujo area. Samples were taken at 13,035 ft. This well had an original contract depth of 11,000 ft., and, after failing to establish production, it was decided to deepen.

W. A. Moncrief 1 Virgil Descant, 31-1n-4e, wildcat 5 miles northeast of Bunkie in Avoyelles Parish, is flowing a small amount of oil and a great deal of salt water from perforations at 9,975-72 ft. and 9,980-82 ft. On previous test of perforations at 9,972-82 ft., the well flowed about 95 per cent salt water and 5 per cent oil.

Shell Oil Co. has completed another oiler below 15,000 ft. in Weeks Island field, Iberia Parish. The firm's Weeks Gall State, 12-14s-7e, was completed for 510 bbl. of oil daily from perforations at 15,210-15,346 ft.

Humble Oil & Refining Co. is preparing to plug its confirmation test to Angie field, Washington Parish, 1 Russell Baughman, 46-1s-14e. The well was originally completed as a shut-in gas well. When turned on test, it went to salt water.

SOUTH LOUISIANA WILDCAT FAILURE

Avoyelles Parish: Humble Oil & Refining Co. 1 Frank T. Turner, 5-2s-3e, dry, TD 12,108 ft.

Southwest Texas

Nueces, Aransas County Tests Get Good Oil Shows

CORPUS CHRISTI.—One and one-fourth miles northwest of West Fulton Beach field, Aransas County, C. G. Glasscock and Pontiac Refining Co. 1 State Tract 48 tested 15 bbl. of oil per hour with tubing pressure of 1,010 psi. Production is from perforations at 6,398-6,404 ft. This new discovery lies across a fault from Copano Bay production.

Meanwhile, another bay wildcat tested oil on drill-stem test from perforations at 8,241-46 ft. Test is Stanolind Oil & Gas Co. 1 State Tract 414, wildcat in the Red Fish Bay area of Nueces County. Oil flowed to the surface in 2½ hours, and tool remained open 2 hours and 20 minutes. Operators are testing up the hole in new perforations at 7,964-74 ft. The well is bottomed at 8,822 ft. and has 5½-in. production string cemented at total depth.

Humble Oil & Refining Co. has opened new gas-distillate pay in East Flour Bluff field, Nueces County, at F-2 East Flour Bluff State. From the Frio at around 8,751 ft., the well flowed 33,000,000 cu. ft. of gas per day plus an unestimated amount of 48.7°-gravity distillate. Tubing pressure on 15/64-in. choke was 4,700 psi. Production in the field is from the Frio at 6,700-6,900 ft. horizons. Structure is an anticlinal closure on the down-throw side of a fault separating the field from Flour Bluff field on the northwest.

Continental Oil Co. has completed an important gas-condensate strike in Hidalgo County at 2 Longoria, et al, San Ramon Grant, Abstract 62. From perforations at 8,837-42 ft., the well was completed for 146 bbl. of 56.8°-gravity distillate and 3,955,000 cu. ft. of gas. Gage was made through 3/16-in. choke.

Potential gage has been run at H. L. Hunt 1 Lawrence R. Brooks, oil discovery located 2 miles northwest of North Jones field in Jim Hogg County. The well is credited with 145.7 bbl. of 48°-gravity oil daily through ⅜-in. choke from perforations at 3,673-77 ft. Hole is bottomed at 4,721 ft. with 5½-in. casing set at 3,768 ft.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) WILDCAT FAILURES

Duval County: Salt Dome Production Co., et al, 1 W. L. Rogers, Jr., Julia Rogers

HOW TO SEE THE "WORKING SURFACE"
—the Vital I. D. of your Casing?

YOU CAN SAFELY, easily and economically remove burrs from gunshot holes, imbedded bullets, or sheaths of cement or hardened mud from the inner wall of casing. ★ No more cut and torn rubber swab cups, or rubber packing elements on testers, packers and cement retainers. ★ The strong, safe Baker ROTO-VERT Casing Scraper has two sets of deeply hard-faced blades which shear away all obstructions and overlap to scrape the full 360-degree inner surface of casing. ★ Cannot "screw down" past gunshot burrs because the cutting edges follow the contour of a LEFT-HAND screw. ★ Specify the ROTO-VERT when there are hundreds of burrs to be removed, or the well is to be scraped from top to bottom. ★ You can still use time-tested Baker Model "B" Casing Scraper, Product No. 620-B, for normal scraping when rotary equipment is available.

Your casing really "comes clean" when you use the successful BAKER ROTO-VERT Model "C" Casing Scraper

BAKER OIL TOOLS, INC.
HOUSTON • LOS ANGELES • NEW YORK

PAGE FENCE - Since 1883
• AMERICA'S FIRST WIRE FENCE •

Sabotage is a danger which calls for vigilance day and night. Property line vigilance is the job for Page Chain Link Fence, now as it has been for more than 60 years. Consult the nearby, long-experienced Page Fence engineering and erecting firm, which will submit cost estimates without obligation. Name and address will be sent with illustrated fence data on request.

Write to PAGE FENCE ASSOCIATION in Monessen, Pa., *Atlanta, Bridgeport, Chicago, Denver, Detroit, Los Angeles, Philadelphia, New York or San Francisco.*

PRODUCT OF PAGE STEEL & WIRE DIVISION OF AMERICAN CHAIN & CABLE COMPANY, INC.

and they're the only ones that do!

Here's the biggest improvement in grab and slip hooks since they were invented — the *exclusive* Laughlin clevis feature that has made an instant hit with users everywhere!

Quick-fastening. Just slip the pin through the clevis and chain, spread the cotter — and they're ready to go to work!

Work-saving. No shackling or cold-shutting — no cutting, bending or rewelding of the chain.

Stronger and safer. Heat-treated and drop-forged for tops in ruggedness — and the forged housings protect workers' hands from injury.

THEY PAY FOR THEMSELVES

Every replacement of an old-style grab or slip hook with a Laughlin Clevis means time, trouble and money saved. That's why a complete change-over to these efficiency-boosters is one of the soundest investments you can make in over-all economy . . . Order Laughlin Clevis Grab and Slip Hooks from your mine, mill or oil field supply house.

Free! Catalog-Data Book tells you how to select the *right* wire rope or chain fitting for every job. Use the coupon below.

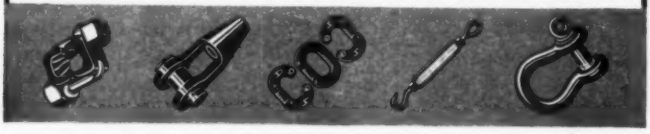
SEND IN TODAY ... no cost or obligation

THE THOMAS LAUGHLIN COMPANY
511 Fore St., Portland 6, Maine
Please send Catalog-Data Book #150 to:

Name.....*Position*.....
Company.....
Street.....
City.....*Zone*.....*State*.....

LAUGHLIN

THE MOST COMPLETE LINE OF DROP-FORGED WIRE ROPE AND CHAIN FITTINGS



and H&GN RR Sec. 15 and 16, dry, TD 4,600 ft.

Frio County: N. B. Hunt 1 R. F. Gluck, James Speed Sur. 175, A-908, dry, TD 3,750 ft.

Jim Wells County: Daubert & Achning 9 Lou Ella Wade, Casa Blanca Lot 1, Block C, Bodie Subd., dry, TD 5,130 ft.

McMullen County: Bridwell Oil Co. 1 Mabel Brawnson, William D. Benham Sur., A-1, dry, TD 3,010 ft.

M. P. Bridwell 1 J. S. Cremine, BS&F Sur. 3, A-143, dry, TD 3,232 ft.

H. R. Smith, et al, 1 C. Martin Estate, Nancy Wright Sur. 18, A-491, dry, TD 9,809 ft.

Nueces County: Stanolind Oil & Gas Co. 1 State 451, Corpus Christi Bay, State Tract 451, dry, TD 9,527 ft.

Starr County: Hickok & Reynolds, Inc., and Geo. H. Coates 1 Manuela Salinas de Guerra, Sec. 300, 18 mi. N of Roma, dry, TD 1,695 ft.

Jergins Oil Co. 1 Juliette Kendall, El Panal Grant, 20 mi. N of Rio Grande City, dry, TD 5,615 ft.

Webb County: Gasoline Production Corp. 1 A. Moos, et al, Sec. 117, Block 1, 15 mi. SW of Freer, dry, TD 3,130 ft.

Williamson County: Cook & Maizel 2 Otto Brackmeyer, Peter Cartwright Sur., dry TD 1,845 ft.

Wilson County: W. E. Field 1 Carlos A. Flores, Mariano Seguin Sur. 16, A-19, dry, TD 3,307 ft.

Rocky Mountain

Williston Discovery Well Plugging Back to Madison

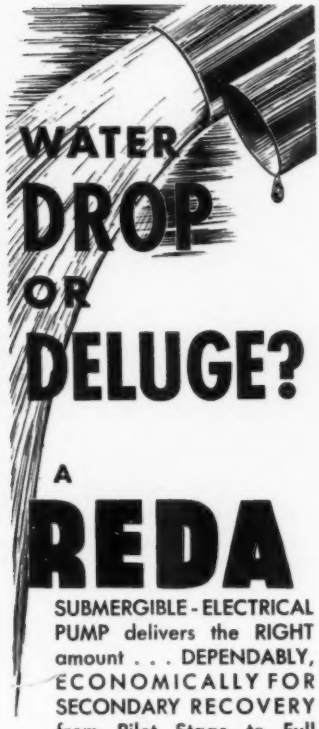
DENVER.—Apparently the Madison will offer the largest oil reserve from present drilling indications in the Williston basin of North Dakota, and Amerada Petroleum Corp. is now plugging back at the Beaver Lodge discovery well for testing the Madison. The well was completed 5 months ago flowing at the rate of 400 bbl. of oil daily from the Devonian at 10,490-10,530 ft. It was drilled to 11,955 ft., total depth, and shows were found in several zones of the Devonian-Ordovician (?). The well has been flowing at the rate of 200 bbl. of oil daily—producing 12 hours per day, since completion. Amerada will now plug back and test the Madison, productive on tests of three wells in the area and topped at 8,295 ft. in this well.

In the Montana portion of the basin Shell Oil Co. is now plugging back for additional testing at 1 Pine Unit, SW SW NE 30-12n-57e, Wibaux County. The well was drilled to 9,746 ft., total depth, and recovered oil on tests of the basal Devonian or upper Ordovician at around 9,000 ft. This wildcat is 130 miles southwest of the Amerada Beaver Lodge field in North Dakota, and 60 miles southeast of Shell's Richey area wildcat, which was the first to find oil in the Montana portion of the Williston basin.

At Richey, Shell's wildcat it at 10,466 ft., total depth, with the operator reaming after coring, probably in basal Ordovician. The Richey wildcat flowed oil from the Mississippian at around 7,200 ft.

North of Richey, in the Poplar Dome area, Roosevelt County, Carter Oil Co. is nearing the Mississippian zone at 1 West Poplar, C NW SW 18-29n-50e, where C. H. Murphy, Jr., of El Dorado, Ark., found oil on a wildcat 6 miles east 2 weeks ago. Carter's well is now below 5,350 ft. The Murphy wildcat, shut down at 5,818 ft., flowed oil on test of the zone 5,664-82 ft.

Several new wildcats are reported planned for both the North Dakota and Montana portions of the basin. During the past week Amerada announced two new wells in the Beaver Lodge area, bringing the total num-



WATER DROP OR DELUGE?

A

REDA

SUBMERGIBLE - ELECTRICAL PUMP delivers the RIGHT amount . . . DEPENDABLY, ECONOMICALLY FOR SECONDARY RECOVERY from Pilot Stage to Full Flood . . .

ENGINEERING DESIGN

Reda Pumps produce the largest volumes obtainable from 5½", 7", 8⅝" casings, often reducing the required number of source wells. Corrosion resistance built into Reda Pumps materially prolongs time between pulling jobs, where corrosion is a factor.

ECONOMY

Reda Pumps reduce investment in number of supply wells required. Reda pumping equipment investment is less per barrel of daily capacity; pumping cost per barrel is lower.

FLEXIBILITY

To fit the changing needs for water volume as the flood progresses, Reda Pump can readily be altered or changed to larger or smaller sizes.

Reda Engineers have been closely associated with WATER FLOOD OPERATIONS for more than ten years and are fully qualified to assist operators in the selection of proper pumping equipment. A letter or phone call will bring prompt results.

REDA

PUMP COMPANY

•

BARTLESVILLE, OKLAHOMA

WHEN THE JOB HAS GOT TO BE

RIGHT!

Snap-on*

TORQOMETERS

assure Precision Tensioning

It doesn't take a man one second longer to snug down a nut to exact tightness of factory specifications, with a Snap-on Torqometer. Sturdy, accurate Torqometers can easily pay for themselves by saving *just one critical assembling job* from "going bad" when it gets back in service. Even the most skilled mechanics can't be expected to approximate specified bolt tension "by feel." But with Snap-on Torqometers, the exact tension can be applied with ease. Torqometers are available in 15 models, ranging from zero to 30 inch-pounds, up to 2000 foot-pounds torque capacity. Factory branch offices and warehouses in 41 important industrial centers. Write for special Industrial and big General Catalogs.

SNAP-ON TOOLS CORPORATION
INDUSTRIAL DIVISION
8098-K 28th Avenue, Kenosha, Wis.

*Snap-on is the trademark of Snap-on Tools Corporation

ber of operations in the general Nesson anticline area to seven for that company.

Seaboard Oil Co.'s Whistle Creek, Wyoming, discovery is being completed for a gage of 208 bbl. of oil in 24 hours through open tubing. The well is 1 State unit, NE NW SW 16-56n-98w, Park County, immediately northwest of Garland field. The well topped Tensleep at 5,795 ft. and casing was cemented on top of that formation. Production is from the top 28 ft. of the formation. Seaboard has made location for a second well in the field, ¼ mile southeast of the discovery.

H. C. Arnold, Tulsa independent, recovered 360 ft. of oil, 120 ft. of oil-cut mud, and 240 ft. of water on 1-hour and 48-minute drill-stem test at 1 Hoover, NE NE SW 3-7n-54w, Logan County, Colorado. This is Arnold's first well in the Colorado portion of the Denver-Julesburg basin. The wildcat topped the J sand at 4,914 ft. and casing has been cemented through the sand with the well at 5,033 ft., total depth.

Other new discoveries in the Denver-Julesburg basin are at testing status now. Zimith Drilling Co. of Greeley has cemented casing at 6,310 ft., total depth, at 1 Nay, SW SW NE 14-9n-58w, Weld County, after finding oil in the J sand. J. G. Dyer-Gifford Parker are testing at 2 Kirchoff, C SE NW 12-6n-61w, in the Greasewood area, Weld County. This well flowed in 32 minutes on test of the D sand. In southern Kimball County, Nebraska, Twin Oil Co.-Rock Hill Oil Co. are shut in for storage at the 1 Enders, NE NW SE 15-13n-55w, a new discovery in this area. This well flowed oil in 90 minutes on test of the J sand.

ROCKY MOUNTAIN MAPS

State maps showing sections, townships, ranges, county seats, oil fields, gas fields, dry holes.

NORTH DAKOTA
SOUTH DAKOTA
NEBRASKA
EAST MONTANA

Complete description and prices sent on request.

E. C. JACOBSON
516 Mayo Bldg. Ph. 21952
Tulsa (3), Oklahoma

COLORADO WILDCAT FAILURES

Northwest Peetz, Logan County: Plains Exploration Co. 1 Beltzer, SE SE SW 28-12n-53w, TD 5,834 ft., dry, Niobrara 4,487 ft., Timpas 4,773 ft., Codell 4,845 ft., Carlile 4,857 ft., Greenhorn 5,034 ft., Graneros 5,095 ft., "D" sand 5,315 ft., "J" sand 5,426 ft., Lakota 5,670 ft., Morrison 5,828 ft.

Northwest Sterling: Deep Rock Oil Co. 1 Schoolland, SE SW NE 26-9n-50w, TD 4,768 ft., dry, Niobrara 3,510 ft., Ft. Hays 3,841 ft., Greenhorn 4,061 ft., "D" sand 4,258 ft., "G" sand 4,307 ft., "J" sand 4,380 ft., Lakota 4,554 ft., Morrison 4,759 ft.

Willow Creek, Moffat County: S. W. McLaughlin 1 State, NW SE NE 36-4n-103w, TD 3,786 ft., dry, Weber 692 ft., Morgan 1,732 ft., Madison 3,532 ft.

Wildcat, Morgan County: Sohio Petroleum Co. 1 Wm. Nicklas, NW NE SE 5-6n-57w, TD 6,542 ft., dry, Niobrara 5,270 ft., Greenhorn 5,710 ft., "D" sand 6,062 ft., "J" sand 6,136 ft., Dakota 6,420 ft., Lakota 6,488 ft., Morrison 6,536 ft.

WYOMING WILDCAT FAILURES

North Quely, Albany County: The California Co. 1 F. S. Holst, NW NW SE 12-17n-77w, TD 5,407 ft., dry, Carlile 3,654 ft., Frontier 4,234 ft., Muddy 5,168 ft., Dakota 5,300 ft., Morrison 5,435 ft.

Fontanelle Creek, Lincoln County: M. R. Homer 1 Hershler, NW NW 3-24n-114w, TD 2,750 ft., dry, Almy 1,340 ft.

Lox area, Natrona County: Husky Oil Co. 1 Lox, C SW NW 35-37n-86w, TD 2,916 ft., dry, Carlile 1,450 ft., first Frontier 1,720 ft., second Frontier 2,014 ft., third Frontier 2,319 ft., Mowry 2,635 ft.

WESTERN NEBRASKA WILDCAT FAILURES

Northeast Harrisburg, Banner County: L. S. Chism 1 Osborne, SE SW SW 26-19n-55w, TD 5,786 ft., dry, Niobrara 4,736 ft., Greenhorn 5,206 ft., first sand 5,549 ft., Muddy 5,648 ft.

Wildcat, Box Butte County: Davis-Hose & Dunbar Drilling Co. 1 Ross, SE NE SE 20-24n-51w, TD 4,561 ft., dry, Pierre 1,030 ft., Niobrara 2,942 ft., Ft. Hays 3,112 ft., Codell 3,189 ft., Carlile 3,208 ft., Greenhorn 3,394 ft., first sand 3,683 ft., stray sand 3,832 ft., Muddy 3,876 ft., Skull Creek 3,916 ft., Dakota 4,071 ft., Morrison 4,317 ft., Sundance 4,423 ft.

Wildcat, Deuel County: S. D. Johnson 1 Armstrong, NW NW SE 9-14n-42w, TD 3,952 ft., dry, Niobrara 2,583 ft., Ft. Hays 2,839 ft., Carlile 2,963 ft., Greenhorn 3,114 ft., "D" sand 3,330 ft., "J" sand 3,451 ft., Skull Creek 3,600 ft., Dakota 3,705 ft., Morrison 3,908 ft.

North Brule, Keith County: Slick-Moorman & R. A. Goodall 1 McLaughlin, SW NE NW 4-14n-41w, TD 3,440 ft., dry, Niobrara 2,632 ft., Ft. Hays 2,899 ft., Greenhorn 3,064 ft., first sand 3,264 ft., "J" sand 3,389 ft.

Ogallala area: Stanolind Oil & Gas Co. and Los Nietos Co. 1 McGuinley, C NE NW 15-16n-38w, TD 3,040 ft., dry, Niobrara 1,931 ft., Carlile 2,324 ft., Greenhorn 2,497 ft., Graneros 2,523 ft., upper Muddy 2,678 ft., Dakota 3,010 ft.

NORTHERN NEW MEXICO WILDCAT FAILURE

La Plata, San Juan County: Southern Union Gas Co. 2 Culpepper-Martin, NW SE SE 30-32n-12w, TD 7,015 ft., dry, Dakota 6,744 ft. (?).

LEGAL

U. S. DEPARTMENT OF THE INTERIOR. Bureau of Land Management, Washington 25, D. C. Notice is hereby given that approximately 100 acres comprising Veterans Administration Hospital Reservation, Long Beach, California, will be offered for oil and gas leasing, through competitive bidding to the qualified bidders of the highest cash amounts per acre, at 1 p. m. December 19, 1951, when bids will be opened. Drilling must be by wells drilled directionally to such land from surface locations on adjacent land. Details of the lease offering and how and where to file bids may be obtained by addressing an inquiry to the Oil and Gas Supervisor at Los Angeles, California, or to this office. Marion Clawson, Director.

OIL FIELD TRAILERS

GENERAL PURPOSE OR SPECIAL

Since Fred G. Spencer built the first oil trailer 35 years ago, this name has stood for leadership. Constant engineering improvements of the several models have made these trailers the most popular in the industry. You'll find understanding of oil industry needs when you call Spencer-Safford Loadcraft. *Early delivery on standard models.*

Spencer-Safford LOADCRAFT INC.
AUGUSTA, KANSAS
SUCCESSORS TO SPENCER TRAILER CO.
ESTABLISHED 1916

Phone 82, Augusta, Kansas, or wire Spencer-Safford Loadcraft for detailed information on pole type, flat beds or vans.

Model P-305 Pole Trailer
PT-406 Heavy-Duty Tandem Axle Pole Trailer
Model J-309 Single Axle Oil Field Semi

Here, Alco welders help meet production schedules on locomotive frames, vital to defense, by using G-E a-c welders. AC welders eliminate troublesome arc-blow encountered when welding high-tensile steels with d-c equipment.

100% A-C WELDED!

Here's How Alco Produces Road Locomotive Frames with G-E Welders

Shown above are two of the many G-E a-c welders used at Alco.

Corners can be difficult to weld, but the absence of troublesome arc-blow with G-E a-c welders enables this operator to lay an even corner bead in any position.

Diesel-electric road locomotive frames are 100% a-c welded at the Schenectady, N. Y., plant of American Locomotive Company. Alco welding engineers report that General Electric a-c welders eliminate troublesome arc-blow, make for easy striking, cost less than d-c, use less power and are easily maintained.

Like the American Locomotive Company, you may also find that you can speed production by using G-E a-c welders. For example . . .

YOU CAN WELD BETTER WITH AC

You have complete control of the arc in all positions because G-E a-c welders eliminate troublesome arc-blow. This reduces the danger of undercutting and slag inclusions and produces better welds.

YOU CAN WELD FASTER WITH AC

In almost every case you can use higher currents and larger electrodes. That means more footage. Users report increases of 10 to 50%.

YOU CAN WELD AT LOWER COST WITH AC

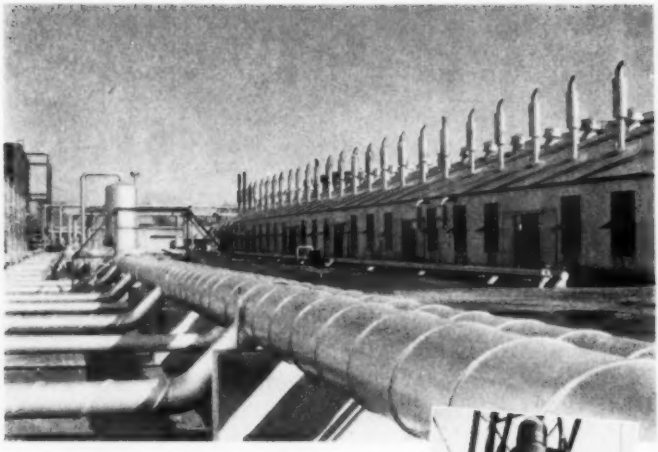
G-E a-c welders cost less than d-c equipment of the same rating. They use only one-fourth as much power when idling and have much lower load losses. And because there are no rotating parts, maintenance is practically negligible.

SEE YOUR G-E WELDING DISTRIBUTOR!

He's listed in the yellow pages of the telephone directory. Just look for General Electric under "Welding Equipment." Your distributor carries a complete line of welders, accessories and electrodes. General Electric, Schenectady 5, N. Y.

GENERAL ELECTRIC

711-47



HEAVY on Service...
LIGHT in Weight...
That's NAYLOR PIPE

Outstanding for gas and oil lines; gas and oil gathering lines; salt water disposal lines; sludge lines; vacuum lines; syphon pipe; tank gauge pipe; tank swing pipe; threaded surface casing.

NAYLOR PIPE

Naylor Pipe Company, 1232 E. 92nd St., Chicago 19, Ill.
New York Office, 350 Madison Avenue, New York 17, N.Y.

Mid-Continent Supply Company, Ft. Worth, Texas and Branches

Exclusive distributors in Mid-Continent and Gulf Coast Areas

Canadian Fields

New Caprona-Fenn Area Gets Oil Confirmation

CALGARY.—Canadian Gulf Oil Co. has set string of production casing at its first follow-up venture in the Caprona-Fenn area of Central Alberta. The new producer flowed oil during drill-stem testing in the D2 zone of Devonian, and found around 96 ft. of D2 section. (The discovery well encountered about 80 ft. of D2). The D3 zone was cored into and tested, but was found water-loaded. The second oil well is Gulf-C.P.R.-Gough 15, in LSD 15, 23-36-20w4, ¼ mile north of the 10 discovery well. The D2 top was contacted at 5,162 ft., or 2,402 ft. subsea, about 12 ft. higher in elevation than the discovery well. Production string of casing has been set at 5,315 ft. for completion as a D2 oil well.

A Lone Rock area step-out venture in Saskatchewan (that previously indicated oil success) commenced bailing operations this week and reported a recovery of about 6 bbl. of heavy crude oil hourly. This well is the first drilled by Albercan Oil Corp. on an 11,256-acre farmout from Franco Oils, Ltd., of Vermilion. Although originally scheduled to go as a Devonian test, oil was found in the higher Sparky sand, and the well is being completed in that formation. A second well has now been started, and it will go as a Devonian test, probably around 400 ft. into that formation.

The new extension success is Albercan-Franco-Epping 1, in LSD 11, 20-47-27w3, about 1¾ miles west of previous Lone Rock oil wells. The crew found a 22-ft. section of good oil sand, ran production string of casing, and perforated the Sparky from 1,890-96 ft. Well is now standing with 850 ft. of clean oil in the hole, waiting installation of pumping equipment.

The second venture, a 1½-mile southwest stepout from Epping 1, and 3 miles west of Lone Rock field, is Albercan-Franco-Epping 2, LSD 11, 18-47-27w3, to be drilled as a Devonian test.

Phillips Petroleum Co. of Oklahoma has discovered natural gas and obtained a small showing of oil at a wildcat venture being drilled in the Peace River area of northwest Alberta. The discovery was made at Phil-Can 1, in LSD 12, 29-89-4w6, about 60 miles northwest of Peace River town. It is believed that the gas came from the Triassic formation. A 57-minute drill-stem test from 3,640-60 ft. gave a gas flow in 4 minutes, at the rate of 1,100,000 cu. ft. daily. Pipe recovery was 55 ft. of oil and gas-cut mud.

Details of oil showings obtained at a wildcat venture in the Three Hills-Twining area of southern Alberta have been released. The well, backed by the Calgary independent team of Anglo Canadian Oil Co., Ltd., Calmont Oils, Ltd., and Kroy Oils, Ltd., is located on farm-out lands from Socony-Vacuum Exploration Co.

The encouraging showings were obtained in the Madison limestone, during two drill-stem tests. The oil recovery was small, but there was no water recovered along with the 29°-gravity crude oil and oil-cut mud that was obtained. Anglo-Socony-Twining 1, in LSD 8, 9-31-24w4, is about 45 miles northeast of Calgary and 21 miles east of the Bailey-Olds 1 "wet gas" Devonian discovery well. The Twining venture is now heading down for its Devonian objectives, with current bottom hole below 5,824 ft.

Madison drill-stem test results are: 75-minute drill-stem test from 5,459½-88 ft., estimated gas flow rate of 50,000 cu. ft. daily, and pipe recovery of 130 ft. of oil-cut gassy mud plus a skim of dark oil on top; at 5,486½-5,503 ft., 55-minute test, 70 ft. of oil and 30 ft. of oil-cut mud.

CANADIAN SUCCESSFUL WILDCATS

B.A.-Cities Service-Clive 1, LSD 13, 16-40-24w4, TD 6,541 ft., 237 bbl. oil.

Los Angeles Alberta Pete 2, LSD 10, 5-20-10w4, TD 2,904 ft., capped gas well.

CANADIAN WILDCAT FAILURES

Home Oil-Atlee 1, LSD 11, 34-21-7w4, TD 4,000 ft., dry.

Anglo-Home-Heather Brae 1, LSD 12, 11-45-19w4, TD 5,110 ft., dry.

Decalta-Socony-Milk River 1, LSD 12, 36-2-18w4, TD 3,696 ft., dry.

EASTERN CANADA

In Elgin County, Ontario, A. G. Bailey & Co., Calgary, drilling on the Russell Humphrey farm, Concession 5, Aldborough Township, have brought in a shallow crude producer at 445 ft. with initial flow of 24 bbl. daily of water-free oil. Location is 300 ft. south of a test shot 2 months ago which failed to produce. The Humphrey well, fourth oil producer in the Rodney area in 5 months, is being put on the pump.

Permian Basin

Spraberry Play Nets New Pool, Several Extensions

MIDLAND. — Spraberry development at week's end included a new pool along one west line of Reagan County, one and two-location extensions on nearly all sides of Tex Harvey field, and a good ¾-mile southwest extension on the southwest side of the Driver area.

The new discovery, on which full details had not been reported, was Goldston Oil Corp. 1 B. Sherrod in 19-C-L&SV. Completion was made from open hole in the Spraberry from 6,829-7,132 ft. and potential on the pump was 120 bbl. of oil a day. Location is about 4 miles northeast of the Pembrook field and 3 miles southwest of the recently discovered Aldwell Spraberry field.

On the Midland County side of Driver field, Magnolia Petroleum Co. 1-L TXL extended production west-southwest with a daily flowing potential of 250 bbl. of oil through 23/64-in. choke, from open hole at 7,172-7,422 ft.

On the Glasscock side of Weiner-Floyd field, Sohio Petroleum Co. 10-A Davenport extended production east with a flowing potential of 438 bbl. of oil daily. Gage was through 48/64-in. choke from pay at 6,859-6,940 ft.

An unusually high Spraberry potential has been turned in for Ashland Oil & Refining Co. 3-46 Davenport, Driver field well in 46-37-T&P. Flowing through ½-in. choke, from 76 ft. of pay starting at 6,974 ft., the well gaged 841.27 bbl. of oil a day.

In northeast Reagan County, Atlantic Refining Co. 1-111 Sugg, east offset to the Sugg-Wolfcamp discovery, flowed 17 bbl. of oil and 56 bbl. of salt water in 14 hours from top of the Spraberry around 5,530 ft. Testing was to continue through ½-in. choke.

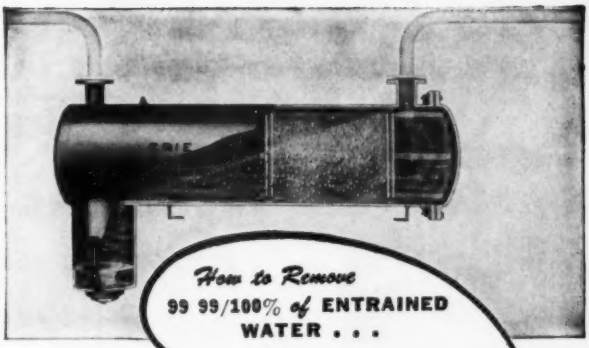
Paul F. Barnhart 1-13 Patterson, Reagan County wildcat in 13-C-L&SV, about 5 miles east-northeast of Goldston's new well, was running Hydrafrac treatment on lower Spraberry. On elevation of 2,678 ft., the Patterson test had upper and lower Spraberry at 6,448 and 7,524 ft. Production tests, if any, had not been reported.

Sinclair Oil & Gas Co. 1 J. B. Calverley, 31-36-T4S-T&P, Glasscock County, completed flowing 247 bbl. of oil a day from Spraberry pay between 6,835-6,910 ft. Prior to Hydrafrac treatment, the well made around 100 bbl. a day. Choke size was not reported. Location is 2 miles east of nearest production in the Driver field.

WEST TEXAS (DISTRICTS 8 AND 7-C) SUCCESSFUL WILDCATS

Howard County: Lloyd H. Smith, Inc. 1 John Boyd, 4-25-H&TC, TD 7,723 ft., elev. 2,324 ft., reef 7,480 ft., pay 7,640 ft., flowed 215 bbl. 44°-gravity oil, TP 725 psi., GOR 1,493 cu. ft.

Midland County: Blackwood & Nichols 1 E. Hofferkamp, 19-38-T1S-T&P, TD 11,316 ft., elev. 2,815 ft., Pennsylvanian 10,454 ft., pay 11,140 ft., flowed 201 bbl.



The Erie Dehydrator-Filter and Water Separator is used in Refineries and Pipe Lines to remove free water from petroleum products. A factual bulletin is available to show how this unit is built—how it operates—its dimensions and capacities and suggestions for its use throughout industry. Write for Bulletin 1186.

ERIE METER SYSTEMS, INC.
MAIN OFFICE AND PLANT, ERIE, PA., U. S. A.

DEHYDRATOR • FILTER • WATER SEPARATOR

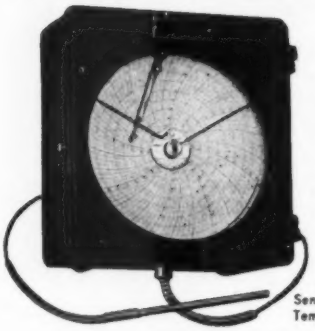
ONLY ONE MOVING PART..

A small, stainless steel valve that *floats* on the condensate load . . . keeps maintenance at a minimum. Continuous discharge under heavy loads, frequent under light loads, gets equipment hotter, sooner and keeps it hot. Over 750,000 Yarways already installed. Sold by distributors throughout the world.

YARNALL-WARING CO. 136 MERMAID AVENUE, PHILA. 18, PA.

AUTO-LITE

TEMPERATURE RECORDERS



For your specific needs!

★ Precision-built recorders provide money-saving proof of temperature behavior.

★ Low-cost protection . . . due to large scale, specialized production.

★ Wide selection of chart ranges.

★ 3 standard types; choice of 24 hour or 7-day movement.

Send for catalog showing Auto-Lite Temperature Recorders and Indicators.

Model "500" Temperature Recorder. Priced from $42.50.

THE ELECTRIC AUTO-LITE COMPANY
INSTRUMENT AND GAUGE DIVISION
TOLEDO 1, OHIO
NEW YORK • CHICAGO • SARNIA, ONTARIO

INDICATING & RECORDING THERMOMETERS

THE RIGHT BALL

Let Strom Help You

Not only in precision ball bearings, but in countless other places, Strom has found that the right ball will do the job better. Maybe your problem can be solved with the use of the proper ball. Why not take it up with Strom.

Strom has been making precision metal balls for over 25 years for all industry and can be a big help to you in selecting the right ball for any of your requirements. In size and spherical accuracy, perfection of surface, uniformity and dependable physical quality, there's not a better ball made.

Pacific Coast Representative: HAROLD R. SWANTON, INC., 1706 So. Grand Ave., Los Angeles 15, Calif.

Strom STEEL BALL CO.
1850 So. 54th Ave., Cicero 50, Illinois
Largest Independent and Exclusive Metal Ball Manufacturer

46°-gravity oil, 3/16-in. choke, TP 690 psi., GOR 1,685 cu. ft.

Schleicher County: Wesley West 2 Mrs. Christena Mittel, 77-TT-TCRR, TD 6,377 ft., elev. 2,348 ft., perf. 6,339-54 ft., flowed 609 bbl. 45°-gravity oil, 18/64-in. choke, TP 835 psi., GOR 818 cu. ft.

WEST TEXAS (DISTRICTS 8 AND 7-C) WILDCAT FAILURES

Crockett County: Neville G. Penrose 1 University, 1-29-University Lands, dry, TD 8,230 ft., elev. 2,309 ft., Strawn 6,895 ft., Simpson 7,250 ft., McKee 7,325 ft., Ellenburger 7,965 ft.

Glasscock County: Stanolind Oil & Gas Co. 1-A H. A. Houston, 2-36-T2S-T&P, dry, TD 7,685 ft., elev. 2,631 ft., Spraberry 6,968 ft.

Howard County: Cosden Petroleum Corp. 1 W. W. Lay, 23-31-T1N-T&P, dry, TD 5,068 ft., elev. 2,501 ft., Clear Fork 3,500 ft.

Martin County: Sinclair Oil & Gas Co. 1-A Harry Lester, 29-36-T3N-T&P, dry, TD 8,751 ft., elev. 2,655 ft., Spraberry 7,250 ft., Dean 8,530 ft.

Mitchell County: Morty Freedman et al 1 Chester Hart, Sec. 5, G. Y. Williams Sur., TD 4,525 ft.

Hassie Hunt Trust 1 Lillie E. Bennett, 34-25-T1N-T&P, dry, TD 6,800 ft., elev. 2,245 ft., Wolfcamp 3,750 ft., base Cisco 5,150 ft.

Pecos County: Moore & Gilmore et al 1 L. L. Byrne, 26-10-H&GN, dry, TD 8,062 ft., elev. 2,530 ft., McKee 6,270 ft., Waddell 7,100 ft., Ellenburger 7,615 ft.

Joseph I. O'Neill 1 W. C. Tyrrel, P. H. Falls Sur. 602, dry, TD 5,394 ft., elev. 2,569 ft., base Permian 5,050 ft., pre-Cambrian 5,360 ft.

Sidwell & Imler 1 E. S. Coler, 1-228-A&NW, dry, TD 3,273 ft., elev. 2,467 ft., Glorietta 2,225 ft., Clear Fork 2,575 ft.

Reagan County: Kemp Drilling Co. 1 Ed M. Hunt, Sec. 11, Blk. L, dry, TD 6,955 ft., elev. 2,646 ft., Spraberry 6,041 ft.

Runnels County: R. B. Heinzen 1 A. J. Thorp, GC&SF Sur., dry, TD 4,123 ft.

Sojourner Drilling Co. 1 J. L. Dowing, J. Parramore Sur. 98, dry, TD 4,815 ft., Caddo 4,780 ft.

Union Sulphur & Oil Co. 1 V. H. Bright, GSSD&RGNG Sur. 35, dry, TD 4,185 ft., Capps 3,648 ft., Gray 4,032 ft.

Warren Oil Corp. 1 J. W. Harris, 9-542-F. Veyerea Sur., dry, TD 4,652 ft., Caddo 4,438 ft., Ellenburger 4,640 ft.

Scurry County: Prigge & Bailey 1 P. H. Coates, Sec. 5, J. W. Bills Sur., dry, TD 585 ft.

Tom Green County: E. A. Poe 1 Ronda Jones, Sec. 29, Mason & Perry Sur., dry, TD 6,717 ft., elev. 1,974 ft., Cisco 3,360 ft., Ellenburger 6,635 ft.

TEXAS PANHANDLE

AMARILLO — Information released on Phillips Petroleum Co. 1 Hobart Ranch, Gray County wildcat, reveals extensive saturation, stain, fluorescence, and odor in the numerous cores and free oil on drill-stem tests from 8,365 to 8,950 ft.

A drill-stem test from 8,365-86 ft. flowed an estimated 6 to 10 million cubic feet of gas in 1 hour. Ten of the subsequent eleven cores taken at intervals from 8,365 ft. to the present drilling depth at 8,950 ft. had good oil or gas traces. All six drill-stem tests recovered oil and gas-cut drilling mud, though salt water was found in all but the first. Samples caught from uncored formations also had odor and stain in some zones.

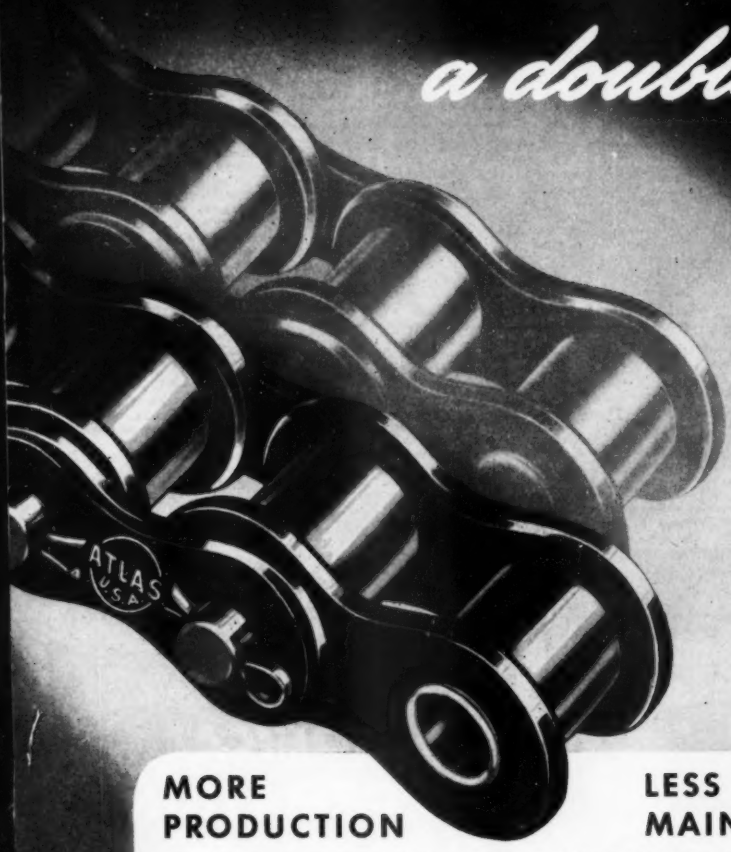
The 1 Hobart Ranch has been drilled tight from a depth of about 7,800 ft. Production shows were from sands, limestones, and conglomerates along the Pennsylvanian shoreline of the Anadarko basin, 7 miles north of present Permian oil production in the Panhandle field. The 10,000-ft. test is expected to explore the lower Pennsylvanian, Mississippian, and Ordovician before completion.

Phillips has recently completed a program to renew expiring leases in the vicinity of the well, and is reported to have taken two nearby drilling obligations.

A swab test on The Texas Co. 1 Flowers, Ochiltree County wildcat which has proved

CHAIN THAT LEADS

a double life!



MORE PRODUCTION

Boosting output of present drives! Atlas Roller Chain is bringing this benefit to plants everywhere.

That's because Atlas Roller Chain provides a positive sprocket grip which makes possible the delivery of full rated horsepower without slippage or friction.

This means that your machines can run at full rated speeds and give greater output . . . with Atlas on the drive.

LESS MAINTENANCE

Here's why: The bushings and pins are case hardened by the Atlas Nicarb Process which provides greater inherent strength. Link plates and rollers are also made of tough, heat-treated alloy steel.

This means better chain performance . . . less chain maintenance.

For maximum production plus long, trouble-free service, install Atlas Roller Chain! Write today for the new Atlas Catalog and Handbook No. 51-OG.

ATLAS CHAIN & MANUFACTURING CO.
PHILADELPHIA 24, PENNA.

ATLAS

ATLAS ROLLER CHAIN

new Lips field area oil production, recovered 184 bbl. of oil in 24 hours from perforations at 8,864-79 ft. After Hydrafrac, production jumped from 2 to 7 bbl. per hour. The company plans to perforate another 3-ft. section in an effort to make the well flow.

In Hartley County, Bridwell 1 Houghton is drilling ahead after recovering 20 ft. of slightly gas-cut mud on a 1-hour drill-stem test from 3,976-90 ft. Bottom-hole pressure on the test was 725 psi., and hydrostatic pressure was 2,025 psi. Previous drill-stem tests taken on this well have recovered oil and gas-cut mud in small amounts.

Drill-stem tests in Permian dolomite of the Sinclair Oil Co. 8 Lips, Roberts County wildcat, recovered 20 ft. of gas-cut mud on a 1-hour test at 3,228-95 ft., and 290 ft. of salt water with 30 ft. of drilling mud on a 1-hour test at 3,328-3,411 ft. Flow pressure ranged from 0 to 60 psi., and 15-minute bottom-hole pressure was 700 psi. on both tests.

TEXAS PANHANDLE (DISTRICT 10) WILDCAT FAILURE

Childress County: Lamar Hunt Trust 1 Johnson, NW NE 601-H-W&NW, 5 mi. N Childress, dry, TD 4,845 ft., elev. 1,758 ft., dolomite 2,730 ft., reef 4,754 ft.

SOUTHEAST NEW MEXICO

Between Gladiola and Denton fields, Forest Oil Co. et al 1 H. L. Low developed some 6,000 ft. of oil and gas-cut mud on a drill-stem test at 10,152-62 ft. Operators were to set plug at 10,180 ft. and start swabbing.

West of the Denton field, Magnolia Petroleum Co. 1 J. D. Black was ready for completion as a discovery in the lower Pennsylvanian. After acidizing and swabbing on perforations at 11,466-84 ft., the well kicked off and flowed 124 bbl. of new oil in 6 hours through 24/64-in. tubing choke. Gravity of the oil was 41.6°, and there was no formation water.

Humble Oil & Refining Co. 1 Federal-Elliott, wildcat in 1-16s-34e, was drilling below 11,516 ft. after developing 840 ft. of gas-cut mud with a small trace of oil on a drill-stem test at 11,309-447 ft.

Skelly Oil Co. 1-L Mexico, 5-25s-38e, new area of Lea County, recovered 5,000 ft. of clean oil on a 4-hour drill-stem test at 10,025-10,125 ft.

The Texas Co. 1 Federal-Elliott had total depth at 13,250 ft. in the Devonian and was preparing to test open hole with packer set at 13,179 ft.

SOUTHEAST NEW MEXICO WILDCAT FAILURE

Roosevelt County: Tide Water Associated Oil Co. 1 Grady Best, 27-2s-39e, dry, TD 7,277 ft., elev. 4,385 ft., Clear Fork 3,963 ft., Tubbs 4,665 ft., Abo 5,250 ft., Wolfcamp 5,940 ft., Mississippian 7,000 ft., granite wash 7,090 ft.

Central Area

MICHIGAN

Rose City-Richfield oil pool, Ogemaw County, continues to be Michigan's only area of substantial activity. Last week two new producers were added in the pool, four wells were in the process of being completed, and drilling permits for six new locations were approved and announced by the Michigan Department of Conservation. In all there was a total of 16 active operations in the field.

The new producers were added by Frank J. Asam and Muskegon Development Co. Asam D-5 State-Foster, NW NE SE 20-24n-2e, Foster Township, Ogemaw County, was rated at only 35 bbl. of oil a day from the Richfield after 1,000 and 6,000-gal. acid treatments at 4,158 ft., plug-back depth. Muskegon E-3 State-Foster, NW SE NE 28-24n-2e, was being flowed at a restricted rate of 84 bbl. of oil daily after a 7,000-gal. acid treatment. The E-3 flowed as much as 160 bbl. of oil in 24 hours after acidization. Well was drilled to 4,232 ft. Oil pays started to show up at 4,172 ft.

Rose City-Richfield oil pool was discovered in 1942 but to the close of 1949 there were only 14 producing wells in the field. During 1950, six completions were scored in the pool of which all but one were oil wells. To date this year 18 completed wells have been in the pool with only one failure. The producing area of the field has been extended in nearly every direction. Newly developed methods for completing Richfield oil wells, a 10-year history of Richfield production in other Michigan fields, a fair to good price for Michigan oil (in comparison to prewar prices), and a lack of newly discovered flush pools in the state all are believed to be contributing factors for this accelerated drilling program in and around this older pool.

MICHIGAN SUCCESSFUL WILDCAT

Newaygo County, Sheridan Township: McClure Oil Co. 1 Johnson, NW SE NW 25-12n-14w, Traverse 2,202 ft., 45 bbl. oil and water, TD 2,205 ft.

MICHIGAN WILDCAT FAILURES

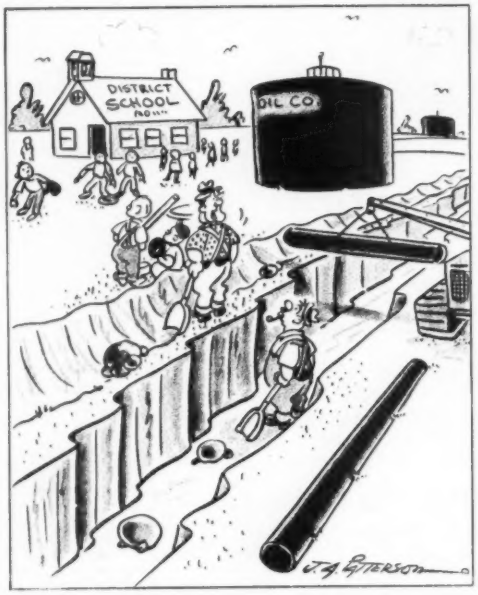
Isabella County, Broomfield Township: W. R. Swetland 1 Baughn, SE NE NE 21-14n-6w, Dundee 3,742 ft., dry, TD 3,781 ft.

Mecosta County, Green Township: The Moco 1 Teachout, NW NW NE 33-16n-10w, Reed City zone 3,548 ft., dry, TD 3,556 ft.

Ottawa County, Polkton Township: McClure Oil Co. 1 Voshel, NW NW NW 32-8n-14w, Traverse 1,808 ft., dry, TD 1,815 ft.

EASTERN KENTUCKY

On Lambric Dome in Breathitt County, Sun Oil Co. is drilling at 2,050 ft. after top-



THE OIL AND GAS JOURNAL

"Th' score's 47 to 13 in favor of th' visitors—now quit pesterin' me!"

COMPLETE GEOLOGICAL INFORMATION at low cost with
Truco DIAMOND BITS
D&S CORE BARRELS
Drilling & Service
3031 Elm Street Dallas 1, Texas
OFFICE PHONE: Riverside-6811
NIGHT NUMBERS: TRemont-5559, Victor-3708, Dixon-4176

Other Offices - Services	Tyler, Texas.....2-2742	Casper, Wyo.....3739
	Odessa, Texas....6-6774	Carmi, Ill.....7801
	Abilene, Texas....2-2790	Ft. Morgan, Colo....1143
	Victoria, Texas.....3264	Glendive, Mont.....540
	Norman, Okla.....4360	Scottsbluff, Neb....1791
	Shreveport, La....3-5474	Hoisington, Kan.....745
Distributors	Diamond Drilling Co., 2759 E. Willow St., Long Beach, Calif., Telephone: Long Beach 40-7949	
	Allied Services, Inc., Mt. Pleasant, Michigan Telephone: 29-861	
Foreign	D. T. O'Connor, 500 Fifth Avenue, New York, N. Y.	
	Petroleum Industry Consultants, C. A., Caracas, Venez.	
	Denton - Spencer Co., Ltd., Calgary, Alberta, Canada.	

Silver Anniversary
MISSION
MANUFACTURING CO.
1951

The Drilling Contractor

today is carrying the greatest burden in the history of oil well drilling

The Drilling Contractor is by far the most important single factor in Oil Development, and his share in this tremendous job is steadily growing. In 1941 he drilled 72% of 32,510 new wells completed in the United States. In 1951 he will drill a *record 89% of 44,000* new wells! In 1941 he drilled footage totalling 71,505,354. In 1951 he will drill 160,000,000 feet of hole.

While more than doubling his *volume*, he has steadily increased his *efficiency!* His average speed of making hole today is 35% faster than in 1941.

The work of the Contractor is becoming more and more demanding. As depths increase, equipment becomes heavier, responsibilities and hazards greater, technical requirements more complex. The successful Contractor must have a background of years of experience, must be able to select and guide outstanding personnel, must know equipment from A to Z, must be capable of financing and managing far-flung operations.

Throughout MISSION'S 25 years in the equipment field, this company has recognized the great hazards the Contractor must take, and the importance of furnishing him the best and most reliable equipment research can develop. MISSION products are the finest that modern science can produce. They make a *real* contribution to the minimizing of drilling hazards, the saving of equipment dollars, the reduction of time and cost per foot of hole.

MISSION
MANUFACTURING CO.

Mission Mfg. Co., Houston, Tex. Export 30 Rockefeller Plaza, New York. Europe: London, England

It Takes You There When Other Cars Can't!

The 4-Wheel-Drive Willys Station Wagon, powered by the high-compression *Hurricane* Engine, assures year-around transportation over all kinds of roads. It climbs a 66 per cent grade and goes through mud, sand, snow and roadless country that stops other cars. There is room for six passengers, plus luggage, tools or equipment. The rear seats easily lift out to provide 98 cu. ft. of cargo space. See your Willys dealer for a demonstration of this remarkable car.

4-WHEEL-DRIVE WILLYS STATION WAGON

ping Corniferous lime at 2,029 ft. No shows have been reported in this wildcat located on the J. H. Russell farm along Quicksand Creek of the Kentucky River. Drilling is continuing to the basal Big Six (Silurian) sand.

In Pilot pool of Estill County, Luscon Corp. is drilling below 500 ft. on 20 H. T. Williams, an eastward extension attempt. Operator previously completed 19 Williams for an initial potential of 100 bbl. of oil daily from Corniferous lime at 901-34 ft., total depth, for the best well to date on the lease.

In Menifee County west of Scranton, L. C. Young is testing a possible pool opener at Hale about 10 miles south of old Ragland field. Operators report pumping at the rate of 5 bbl. oil daily from Corniferous lime at approximately 1,000 ft.

EASTERN KENTUCKY WILDCAT FAILURE

Elliott County: Roy Davis et al 1 Mason, Mouth of Mason Branch, dry, TD 950 ft., Weir sand 901 ft., made noncommercial shows of oil.

WESTERN KENTUCKY

Ralph Halbert's new rank wildcat discovery well, 1 Hartford, WL SW NW SW SW 5-M-26, 6 miles southeast of Sebree, in the eastern corner of Webster County, swabbed 7 bbl. of oil per hour natural. The Tar Springs sand pay zone at 1,971-82 ft. then was given a 30-qt. shot, after which the well swabbed 30 bbl. in the first hour while cleaning out. Nearest production is at Sebree.

Production in the recently opened Baskett area, 4 miles northeast of Henderson, Henderson County, is being extended 3,500 ft. to the south by George Hoffman and associates at their 1 Rash heirs, NE NW SW 16-Q-25, completing in O'Hara lime at 2,362-72 ft. Production was gaged at 1,230 bbl. during the first 24 hours, and 830 bbl. the second. Later, the well was reported swabbing and flowing at an average rate of 14 bbl. per hour.

WESTERN KENTUCKY SUCCESSFUL WILDCAT

Henderson County: John Partin 2 Cavins, SE SE SE 15-P-21, IP 175 bbl., McClosky 2,572-78 ft., TD 2,587 ft. (extension Hitesville Consolidated pool).

WESTERN KENTUCKY WILDCAT FAILURES

Henderson County: Ashland-Buchman-O'Neal 1 Royster, NE SW SE 11-O-22, dry, TD 2,721 ft.

Indiana Farm Bureau 1 Gazley, 7-Q-20, dry, TD 2,715 ft.

Hopkins County: Guy Parris 1 Timmons, SE NE NE 19-M-25, dry, TD 3,240 ft.

Webster County: Delta Drilling Co. et al. 1 White, SE SE NW 25-N-23, dry, TD 2,719 ft.

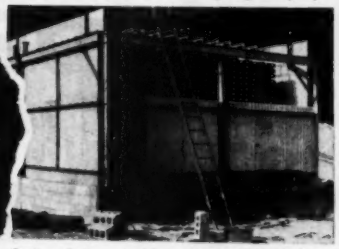
ILLINOIS

A promising O'Hara lime oil discovery appears to have been made by Peak Drilling Co. at its 1 King, SW SE SW 27-1n-10e, 7 miles northwest of Albion, northwestern Edwards County. The well, located 2 miles from production in the Bennington-Maple Grove area, flowed clean oil in a drill-stem test with saturation at 3,262-72 ft. A good showing of gas was obtained, with gas at the surface within 2 minutes after the tester was opened. Oil followed 12 minutes later. Indicated bottom-hole pressure was 1,283 psi. Hole has been deepened to 3,310 ft., and oil string run through the pay for production tests.

A half-mile extension of production in the Mason area of Effingham County is in prospect where C. J. Simpson found good saturation in both the Rosiclare and McClosky zones in his 1 Davis, SW SW SW 23-6n-5e. Location is near the southeast edge of the Mason townsite. Rosiclare pay was logged at 2,454-62 ft., and McClosky at 2,470-78 ft. and 2,482-90 ft. A drill-stem test, open 50 minutes and taking in the section below 2,450 ft. got gas within 15 minutes and flowed clean oil in 41 minutes with a bottom-hole pressure of 850 psi. In the

TWO BASIC COOLING PROBLEMS *solved* FOR THE LONG ISLAND LIGHTING COMPANY WITH NATIONAL CAST IRON COOLING SECTIONS

National Cast Iron Cooling Sections for compressor and engine jacket water at the Glenwood Landing Plant of Long Island Lighting Company.



Cooler of three double banks of National Sections for scrubbing liquor at the Glenwood Landing Plant of Long Island Lighting Company.

National Cooling Sections installed at the new gas conversion plant of the Long Island Lighting Company at Glenwood Landing, are (1) cooling the recirculating scrubbing liquor which cleans and cools finished gas in the reforming process, and (2) cooling the fresh water that is circulated in the jackets of gas compressors.

Over 28,000 square feet of cooling surface is provided by these National Sections built up in banks of parallel stacks of sections in series—1254 sections in the scrubbing cooler and 1280 sections in five compressor coolers.

In this plant the National Sections operate as a closed cooling system—fresh water being circulated through the sections with raw salt water from Hempstead Harbor sprayed over the section exteriors—thus prolonging the life of the equipment because corrosive salt water is not in contact with operating machinery. National Cooling Sections are made of highest grade cast iron, have high resistance to salt water corrosion and are economical both in first cost and maintenance.

The installation has proved so satisfactory that additional National Sections have been purchased by the Long Island Lighting Company for new construction.

If you have similar cooling problems or are interested further in the possibilities of National Sections, send the coupon below for detailed information.

NRC *Heat Transfer Division*

THE NATIONAL RADIATOR COMPANY

JOHNSTOWN, PENNSYLVANIA

SEND COUPON TODAY!

The National Radiator Co., Heat Transfer Division, OG
Johnstown, Pennsylvania

Please send Technical Manual HT-20 on National Condensing and Cooling Sections.

Name_____

Firm_____

Address_____ City_____ Zone_____ State_____

When the chips are down and you are up against it

Call Santa Fe

When you get up against a tough shipping problem just call your Santa Fe freight man... let him work it out and make it easier for you.

F. H. Rockwell, Gen. Freight Traffic Manager
Santa Fe System Lines, Chicago, Ill.

breakdown, the full string of pipe was found filled with oil. Casing has been run to bottom (2,490 ft.).

Perrine & Perrine 1 Ellis, NW NW NE 30-1s-4e, a wildcat 1½ miles southeast of the Divide pool and about the same distance southwest of the Divide South pool, Jefferson County, is being put on the pump for completion following swabbing tests in which it made 150 bbl. per day. Pay zone is Aux Vases sand at 2,671-77 ft. from other production.

ILLINOIS SUCCESSFUL WILDCATS

Marion County: Walter C. Wellman 1 Langerwisch, NE SW NE 4-1n-1e, IP 2 bbl., Petro sand 797-811 ft., TD 824 ft. Slivka & Son 1 Wooten heirs, NE NW SE 21-1n-2e, IP 10 bbl., Benoist 1,908-18 ft., TD 1,918 ft.

ILLINOIS WILDCAT FAILURES

Clay County: E. A. Reed 1 King Community, SW NW NE 29-4n-5e, dry, TD 2,845 ft.

(Continued on page 245)

Louisiana-Arkansas

Apparent Successes Highlight Activity

SHREVEPORT.—In Sabine Parish, Carter Oil Co. had an oil show in its 1 Mansfield Lumber Co., C NE NW 3-6n-14w. The wildcat recovered 270 ft. of gas-cut mud with the show on a 50-minute drill-stem test from 3,647-3,700 ft. More than a week ago the well threatened to get out of control with gas kick coming from the interval tested. It is now drilling ahead toward a projected depth of 6,500 ft.

Smackover lime production, a new pay in Southeast Haynesville field, has been indicated at Nelson & Morris, Ltd. et al 1 Prestige, Martin et al, C SE SW 10-22n-7w, Claiborne Parish. A drill-stem test at 10,532-80 ft. had an immediate blow with top working pressure of 3½ psi. After 11 stands were pulled, the well flowed over the top. Later recovery was seven stands of 49°-gravity oil, water, and mud with one stand of gas-cut mud.

Rodessa pay has been tapped in Greenwood (Paluxy) field, Caddo Parish. C. R. Schuster 1 Eistner-Grey, NW SE NW 7-17n-15w, flowed at the rate of 177 bbl. of oil per day from 4,820-30 ft. Total depth is 4,837 ft., with 5½-in. casing set on top of the Rodessa sand at 4,816 ft.

A. J. Hodges Industries 1 Pardee et al has extended Webster Parish's Cotton Valley field a mile west into Bossier Parish. The well produces gas-distillate from the Davis sand perforated at 8,858-78 ft. Total depth is 9,550 ft. with 5½-in. casing set to 8,950 ft. Location is 816 ft. south and 720 ft. west of center of Section 26-21n-11w.

Pump is being installed at Barnett Serio 1 Wilds, C SW SW 7-7n-7e, indicated Wilcox discovery in Concordia Parish. The wildcat has 5½-in. casing cemented at total depth of 5,515 ft.; perforations were made from 5,131-32 ft. On a drill-stem test gas was at the surface in 2 hours and 28 minutes; recovery was 2,000 ft. of oil and 500 ft. of oil-cut mud.

Arkansas.—A new pool is indicated for Columbia County at McAlester Fuel Co. A-1 McCollum, C NW NE 22-19s-21w. A core in the Pettit between 5,840-90 ft. had 10 ft. of good saturation. A 15-minute drill-stem test showed a porous section with an oil show at 5,860-66 ft., and yielded 180 ft. of 37°-gravity oil and 40 ft. of heavily oil-cut mud. The well will be carried on to the Smackover expected around 10,500 ft.

NORTH LOUISIANA WILDCAT FAILURE

Franklin Parish: McAlester Fuel Co. 1 Leona Clark "A," 330 ft. N and 321 ft. W SEc NW NE 7-15n-8e, dry, TD 4,051 ft.

Four-Color Wall Maps

Attractive pipe-line wall maps for readers of The Oil and Gas Journal. Clip advertisement and mail today!

1951—CRUDE-OIL AND PRODUCTS PIPE-LINE WALL CHART—Shows all crude and products pipe lines in the United States. Special insets of Tulsa, Houston, and Western Canada. Major refineries and capacity listings also on this map. Price $2.00 each.

1950—NATURAL-GAS PIPE LINES OF THE UNITED STATES—Describes 48 major and 66 smaller gas pipe-line systems in the United States. Important information at your finger tips. Handsome for framing. Price $1.50 each.

Mail selection of offers and check to

READER SERVICE DEPARTMENT

THE OIL AND GAS JOURNAL

BOX 1260 **TULSA, OKLA.**

TOUGHER THAN EVER!

the New

BJ

PYRAMID TOOTH

tong die

Grips like a die has never gripped before. Won't chip. Reversible.

ANOTHER **BJ** ENGINEERED PRODUCT

Byron Jackson Co.

Since 1872

MAIN OFFICE & PLANT: LOS ANGELES 54, CALIF.

Mid-Continent Office & Plant: Houston 1, Texas

Export Office: New York 17, New York

JOBBERS IN ALL PRINCIPAL OIL FIELDS

Head: SAE 1020 steel
Body: Steel forging
Valve and Seat: Anderloy
Head bolts: Heat treated alloy steel
Other parts: Stainless steel

Specify this trap for

HIGH TEMPERATURES AND PRESSURES

Here's a trap capable of withstanding 800° total temperature and 500-pound pressure without danger of fracture! Made for ½" and ¾" pipe connections. This is the only forged steel steam trap available with all pipe connections in the head for straight-in-line or elbow connection, eliminating *extra expensive fittings.* Also permits the trap to be serviced *without disturbing a single fitting!* For further information, contact your nearby Super-Silvertop representative or mail coupon.

THE V. D. ANDERSON COMPANY

1981 WEST 96TH STREET • CLEVELAND 2, OHIO

Please send the following:

☐ Details on new high pressure steam trap.

☐ 36-page book "Solving Steam Trap Problems."

Name .....

Address .....

City ..... *State* .....

In Canada: Bawden Machine Co., Toronto

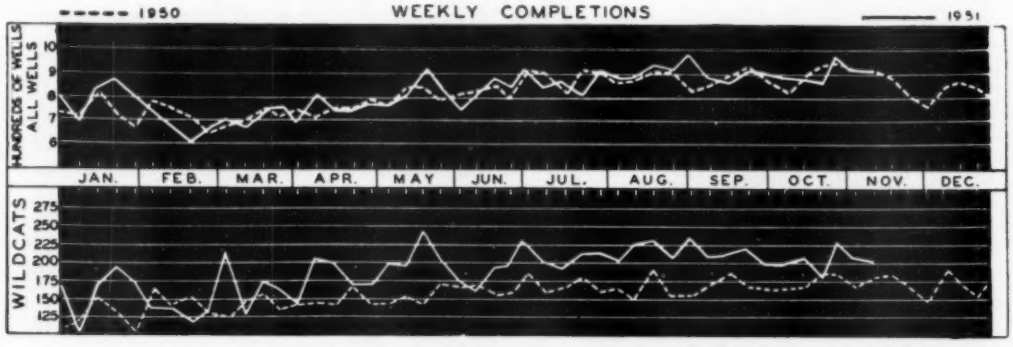
CURRENT STATISTICS

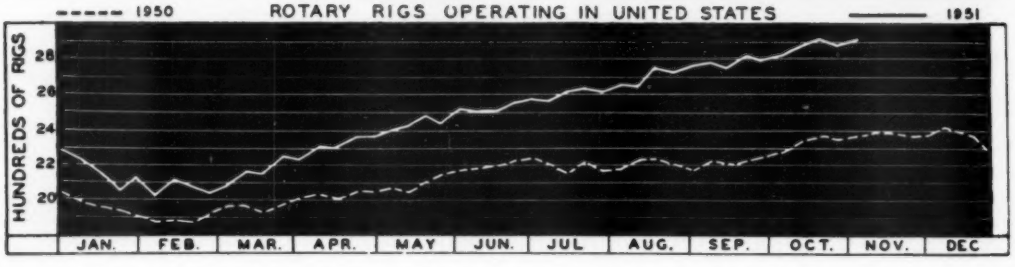
EXPLORATION

WEEKLY WELL COMPLETIONS . . . . WEEK ENDED NOVEMBER 10, 1951

	Total of all wells					Nov. 10		Wildcat completions and discoveries					Cumulative total, 1951				
	Comp.	Oil	Gas	Dry	Footage	1951	1950	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	10	5	0	*5	15,731	557	610	0	0	0	0	0	0	0	0	0	0
Pennsylvania	22	9	5	†8	31,696	1,260	1,195	0	0	0	0	0	0	0	2	2	4
West Virginia	14	2	8	4	42,101	533	577	0	0	0	0	0	0	0	7	4	11
Ohio	28	9	10	19	56,718	843	903	0	0	0	0	0	1	0	6	25	32
Indiana	28	11	0	17	49,420	1,171	1,403	2	0	0	7	9	56	0	2	416	474
Kentucky	23	5	4	14	53,713	1,084	1,010	1	0	0	5	6	35	0	1	196	232
Illinois	38	11	0	27	86,810	2,038	2,467	2	0	0	11	13	82	0	0	640	722
Michigan	10	5	0	5	28,623	660	779	1	0	0	3	4	16	0	6	277	299
Kansas	104	54	5	145	349,734	3,799	3,417	4	0	0	21	25	177	1	12	762	952
Nebraska	5	0	0	5	20,779	201	100	0	0	0	5	5	15	0	2	100	117
Oklahoma	137	78	2	57	517,960	4,833	4,681	8	0	1	18	27	158	5	21	622	806
Texas	328	202	15	111	1,575,625	14,366	14,241	15	0	0	71	86	640	49	107	2,958	3,754
N. Central (Dist. 7-B & 9)	103	48	0	55	351,057	4,373	4,318	10	0	0	29	39	313	3	15	1,269	1,600
West (Dist. 7-C & 8)	116	94	0	22	680,398	4,393	4,306	3	0	0	16	19	159	10	7	559	735
Panhandle (Dist. 10)	19	6	11	2	62,261	627	783	0	0	0	1	1	2	0	0	26	28
Eastern (Dist. 5 & 6)	6	4	0	2	33,624	1,020	991	0	0	0	2	2	9	9	2	200	220
Gulf Coast (Dist. 2 & 3)	44	27	2	15	270,540	1,983	1,988	2	0	0	11	13	83	19	51	411	564
Southwest (Dist. 1 & 4)	40	23	2	15	177,745	1,970	1,850	0	0	0	12	12	74	8	32	493	607
Louisiana	36	24	2	10	182,571	1,876	2,123	0	0	0	2	2	40	10	7	251	308
Northern	23	14	2	7	76,384	1,030	1,139	0	0	0	1	1	13	0	4	149	166
Southern	13	10	0	3	106,187	846	984	0	0	0	1	1	27	10	3	102	142
Arkansas	10	6	0	4	32,804	365	347	0	0	0	0	0	15	1	2	75	93
Mississippi	9	3	0	6	59,546	313	276	1	0	0	5	6	13	4	0	122	139
Southeastern States	0	0	0	0	0	46	52	0	0	0	0	0	1	0	0	18	19
Montana	0	0	0	0	0	189	214	0	0	0	0	0	0	0	1	31	32
Wyoming	22	13	0	9	123,888	662	514	0	0	0	3	3	14	0	1	95	110
Colorado-Utah	5	1	0	4	26,016	260	87	0	0	0	4	4	9	0	6	119	134
New Mexico	35	8	19	8	156,184	596	534	0	0	0	2	2	13	0	9	67	89
California	41	32	0	9	146,286	2,004	1,554	1	0	0	8	9	51	0	4	400	455
Miscellaneous	0	0	0	0	0	69	48	0	0	0	0	0	1	0	21	47	69
Total United States	905	478	70	357	3,556,185	37,725	37,132	35	0	1	165	201	1,337	70	217	7,227	8,851
Total previous week	917	470	64	383	3,613,879			31	1	6	171	209	1,302	70	216	2,062	8,650
Total November 10, 1950	913	494	58	361	3,313,187			21	1	3	154	179	969	65	183	5,601	6,818

Service wells included: *5, †6, 12.





DAILY AVERAGE PRODUCTION FOR WEEK

	Nov. 10 crude oil	B. of M. Nov. demand	Nov. 3 crude oil
Alabama	2,600	2,400	3,100
Arkansas	76,650	85,000	76,400
California	984,800	983,000	988,500
Colorado	77,300	75,000	78,900
Eastern	61,500	61,000	60,000
Florida	1,625	1,600	1,750
Illinois	163,400	161,000	169,500
Indiana	31,600	31,000	32,900
Kansas	304,350	319,000	312,750
Kentucky	34,500	31,000	33,900
Louisiana	603,925	655,000	611,825
North Louisiana	113,300		112,950
South Louisiana	490,625		498,875
Michigan	39,200	40,000	40,400
Mississippi	97,240	104,000	99,900
Montana	24,200	26,000	24,700
Nebraska	7,500	8,000	7,450
New Mexico	149,625	155,000	149,725
Oklahoma	502,500	527,000	509,450
Texas	2,789,000	2,750,000	2,832,125
Dist. 1 (Southwest)	33,300		34,100
Dist. 4 (Southwest)	255,200		262,350
Dist. 2 (Gulf Coast)	166,500		169,825
Dist. 3 (Gulf Coast)	466,675		481,925
Dist. 5 (Eastern)	54,125		54,675
Dist. 6 (Eastern)	121,900		120,600
East Texas field	277,500		273,500
Dist. 7-C (West)	113,750		112,175
Dist. 8 (West)	975,675		993,900
Dist. 7-B (W. Central)	83,175		85,300
Dist. 9 (N. Central)	158,000		160,000
Dist. 10 (Panhandle)	83,200		83,775
Utah	3,700	5,000	3,800
Wyoming	184,500	190,000	185,200
Total United States	*6,139,715	6,210,000	6,222,275
Change from prev. week, down	82,560		
Canada	117,515		130,480

Total U. S. production January 1-November 10 †1,923,938,205 bbl.
Same period last year (crude plus cond.) 1,684,686,000 bbl.

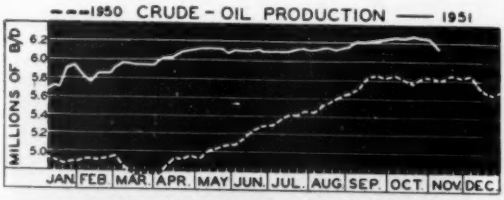
*Not including 109,315 bbl. condensate. †Including 33,034,155 bbl. condensate.

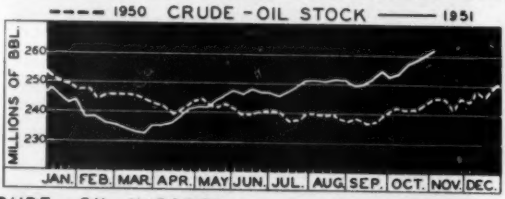
CRUDE OIL STOCKS BY STATES OF ORIGIN*

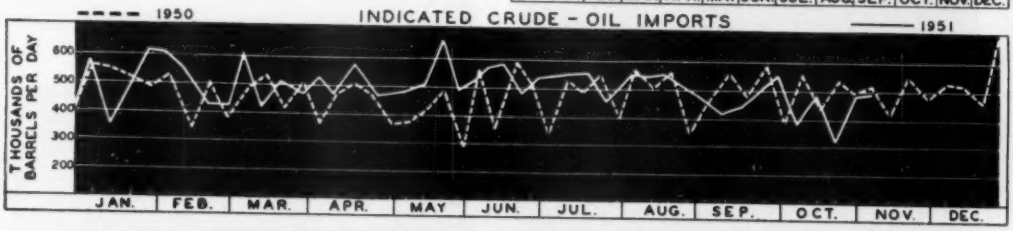
(Thousands of barrels)

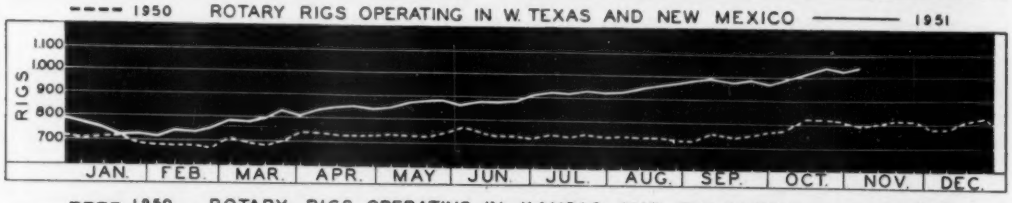
	Nov. 3, 1951	Oct. 27, 1951	Nov. 4, 1950
Pennsylvania Grade	1,944	2,044	2,254
Other Appalachian	1,668	1,698	1,388
Illinois, Indiana, Michigan	13,064	13,287	9,674
Arkansas	2,705	2,743	2,357
Louisiana	15,124	15,162	13,839
North	2,845	2,859	3,085
Gulf	12,279	12,303	10,754
Mississippi	3,460	3,515	2,135
New Mexico	7,334	7,396	6,999
Oklahoma and Kansas	39,294	39,813	37,834
Texas	126,161	124,075	120,337
East Texas	15,269	15,393	14,618
West Texas	54,464	53,438	45,923
Texas Gulf	27,665	26,851	28,863
Other Texas	28,763	28,396	30,933
Rocky Mountain	15,168	13,923	11,078
California	29,629	29,651	30,537
Foreign	6,610	6,545	6,503
Total	262,161	259,852	244,935

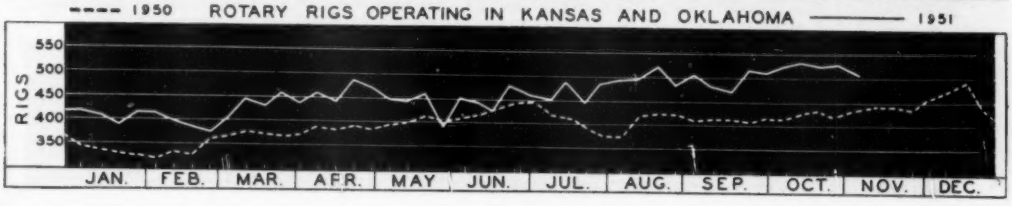
*Bureau of Mines.









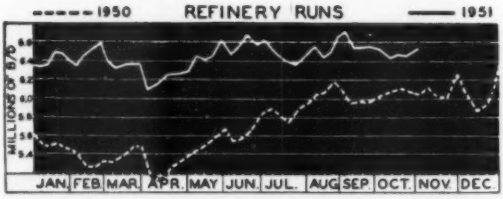


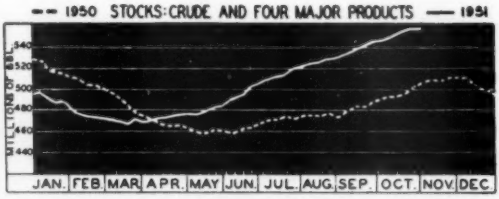
A.P.I. REFINERY REPORT, NOVEMBER 3

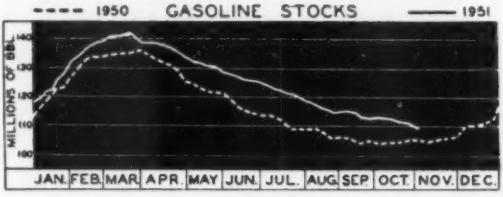
(Thousands of barrels)

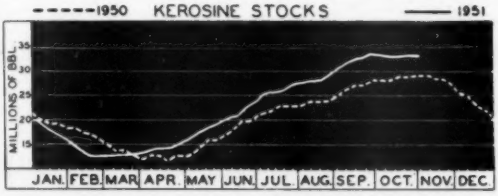
District—	Daily avg. crude runs	Daily average production				Stocks at refineries, bulk terminals, in transit and in pipe lines				Bureau of Mines, November 1950				
		Gasoline*	Kerosine	Distillate	Residual	Gasoline†	Kerosine	Distillate	Residual	Daily avg. crude runs	Daily average production: Gasoline*	Kerosine	Distillate	Residual
East Coast	996	399.4	50.6	250.3	208.4	23,848	11,833	35,688	11,953	903	337.6	31.1	232.7	202.4
Appalachian:														
District 1	100	39.7	4.6	16.3	12.0	2,506	619	1,125	625	103	40.5	6.1	12.9	12.0
District 2	76	34.2	7.1	11.3	19.6	1,309	400	317	280	65	29.9	4.3	6.8	14.4
Ind., Ill., Ky.	1,185	652.2	79.6	188.6	168.4	22,637	7,519	21,942	6,527	1,125	600.0	69.8	187.7	170.2
Okla., Kans., Mo.	523	268.7	12.9	126.0	69.1	11,526	2,028	11,967	2,247	503	276.7	17.2	105.1	60.2
Inland Texas	254	175.2	14.4	34.8	44.3	3,847	629	2,016	1,344	212	151.3	11.8	34.1	40.3
Texas Gulf Coast	1,551	727.4	143.4	376.6	236.9	17,610	5,535	14,060	6,881	1,456	677.2	119.6	337.1	261.3
La. Gulf Coast	519	245.3	60.8	119.3	64.6	6,280	3,385	3,757	2,080	489	221.6	57.3	107.2	62.4
N. La. and Ark.	83	39.4	6.7	19.6	7.0	2,762	705	1,219	178	75	29.3	8.3	17.4	7.6
Rocky Mountain:														
New Mexico	13	8.1		2.8	3.9	118		89	41	12	7.4	.3	2.4	3.2
Other Rocky Mtn.	215	105.4	8.6	43.4	45.4	3,097	381	1,972	1,084	205	93.5	7.0	38.7	47.2
California	1,026	456.0	2.3	129.0	376.4	13,883	488	8,774	15,350	936	394.2	9.0	135.6	358.9
November 3, 1951	6,543	3,151.0	391.0	1,318.0	1,256.0	109,513	33,522	102,926	48,570	6,085	2,859.2	341.8	1,217.5	1,240.1
October 27, 1951	6,461	3,194.9	367.6	1,340.0	1,204.7	111,120	33,541	102,106	49,168					
November 4, 1950	6,117	2,879.4	329.9	1,249.6	1,214.3	104,350	29,115	86,886	44,911					

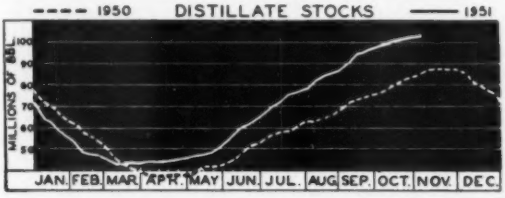
*At refineries including natural blended. †Finished and unfinished.

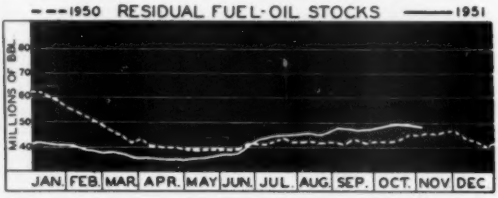


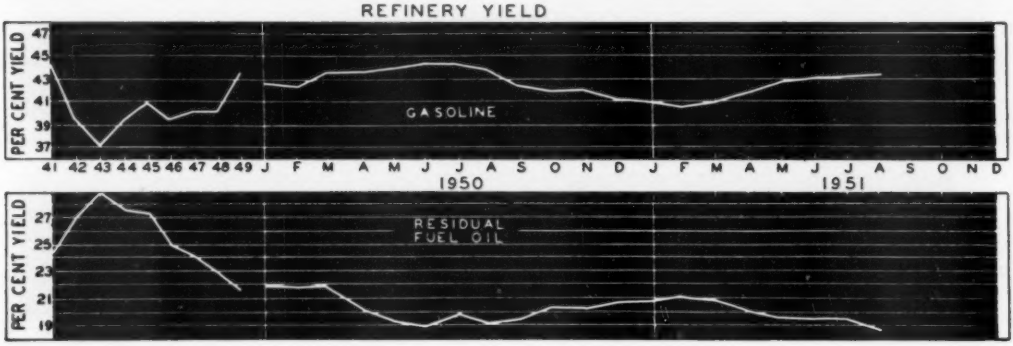











REFINERY YIELD
PER CENT YIELD
GASOLINE
41 42 43 44 45 46 47 48 49 J F M A M J J A S O N D J F M A M J J A S O N D
1950
1951
PER CENT YIELD
RESIDUAL FUEL OIL

CRUDE PRICES

GRAVITY SCHEDULE

	Signal Hill, Calif.‡	Oklahoma, Kansas	Gulf Coast Tex.*	West Tex†
18-18.9	$1.93			
19-19.9	1.98			
20-20.9	2.03	$2.25		$2.12
21-21.9	2.07	2.27		2.14
22-22.9	2.12	2.29		2.16
23-23.9	2.18	2.31		2.18
24-24.9	2.24	2.33	$2.56	2.20
25-25.9	2.30	2.35	2.58	2.22
26-26.9	2.36	2.37	2.60	2.24
27-27.9	2.41	2.39	2.62	2.26
28-28.9	2.46	2.41	2.64	2.28
29-29.9	2.52	2.43	2.66	2.30
30-30.9	2.57	2.45	2.68	2.32
31-31.9	2.62	2.47	2.70	2.34
32-32.9	2.68	2.49	2.72	2.36
33-33.9		2.51	2.74	2.38
34-34.9		2.53	2.76	2.40
35-35.9		2.55	2.78	2.42
36-36.9		2.57	2.80	2.44
37-37.9		2.59	2.82	2.46
38-38.9		2.61	2.84	2.48
39-39.9		2.63	2.86	2.50
40 and above		2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point.

†Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947.

‡Standard Oil Co. of California.

FLAT CRUDE PRICES

Representative posted schedules per barrel.	
East Texas†	$2.65
Kettleman Hills, California*	2.80
Beauregard Parish	2.60
Illinois Basin	2.77
Pecos County, Texas (Yates)	2.35
Bradford, Pennsylvania	4.25
Eastern Ill. and Western Ind.†	2.77
Tomball, Texas Gulf Coast	2.83

*37-37.9°. †35° and above.

MOST refiners in the Mid-Continent are trying to estimate the effect of the early November cold weather on demand for light and heavy fuels. Early returns were in the form of increased orders and a gain in the number of inquiries. It is now rather generally agreed that the actual effect of the abnormal weather at the first of the month will be spread over most of November.

Any consumer tanks for home-heating fuel that had not been completely filled during the summer months are probably almost empty now. Retail sales to these accounts will leave some space in reseller tanks which may be filled out of terminal storage. In many cases it may be at least 2 weeks before the effect is felt at the refining level in the Mid-Continent.

If the last half of November brings normal weather to the areas using distillates and residual for space heating, the early cold-weather demand will add enough to make November a better-than-normal month. On the other hand, warm weather in the last half could cut consumption more than enough to offset the high demand early in the month.

Increased sales of residual for bunkering in the New York and Boston areas following the dock strike are bringing some relief to operators with crowded dirty storage. Unless these areas have very warm weather in the last half of the month, suppliers will be able to find tank space for residual this season.

The demand trend for a longer period is indicated by consumption of fuel oil by electric-utility plants. These plants used 14 per cent less residual in September than in the same month last year.

Gulf-East Coast tanker rates are up again. Charters for the period November through April were made at a rate of 140 per cent over the Maritime Commission base.

REPRESENTATIVE QUOTATIONS

Representative spot-market quotations of leading suppliers as of November 12, 1951. Figures are f.o.b. plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Texas Gulf Coast
Regular gasoline, 80-82 octane	10¼-10½	12-12.75	10¾-11
Premium gasoline, 86-88 octane	11¼-11½	13.5-13.75	11¾-12
42-44 w.w. kerosine	9-9⅜	10	9
No. 2 straw fuel oil	8-8½	9	8
No. 6 residual	$1.65-1.75	$2.45-2.60	$1.75-1.90

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	6⅞	6⅜	6⅝
Grade 18-55	8.25	7.75	8.0

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	13-13.5
750 vis., No. 3-4 neutral	16
2,000 No. 5-6 neutral	18-19

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	29-30
200 vis., No. 3 neutral, 0-10 pp.	17.5-18.5

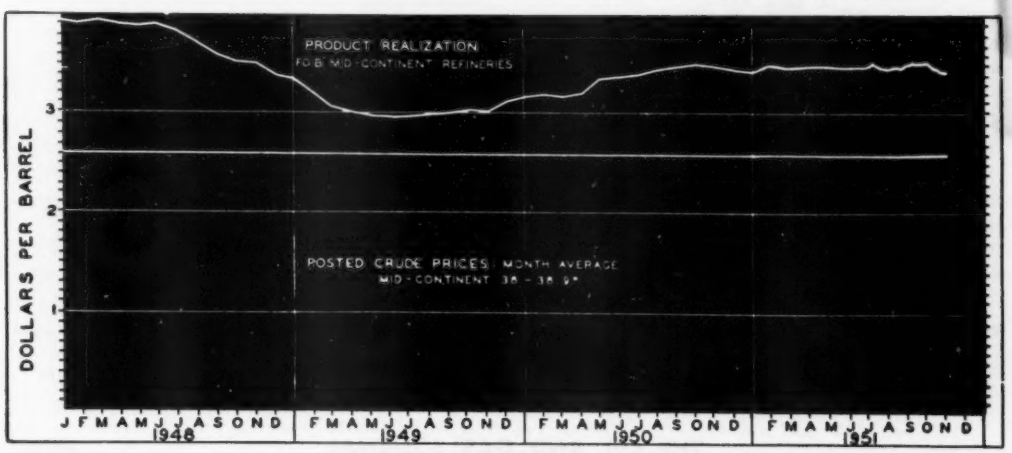
Western Pennsylvania

145-155 vis., 10 p.t. bright stock	32.5
180 vis., 0 p.t. neutral	31.5

WAX

Mid-Continent

132-134 A.M.P.	5.5


PRODUCT REALIZATION
F.O.B. MID-CONTINENT REFINERIES
POSTED CRUDE PRICES: MONTH AVERAGE
MID-CONTINENT 38 - 38.9°
DOLLARS PER BARREL
3
2
J F M A M J J A S O N D
1948
F M A M J J A S O N D
1949
F M A M J J A S O N D
1950
F M A M J J A S O N D
1951

In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate, and fuel oil. Realization averaged $3.42 for week ended November 3, $3.43 for previous week, and $3.50 for November 1950.

"One of the surest ways to make money is to save money..."

CAPTAIN EDDIE RICKENBACKER

President and General Manager
Eastern Air Lines, Inc.

"... and the purchase of U. S. Savings Bonds through the Payroll Savings Plan is an easy way to save. It is good for the community. It is good for you because it means money available for a rainy day. Through the thousands of years that men have roamed the globe there have always been rainy days."

A vigorous exponent of thrift, Captain Eddie Rickenbacker made the Payroll Savings Plan available to his employees of Eastern Air Lines some years ago. From time to time, in personally dictated letters addressed "To All Members of Eastern Air Lines Family", he points out the individual and national advantages of the Payroll Savings Plan, and urges members of Eastern Air Lines Family "... to sign up on the Automatic Payroll Savings Plan. In years to come I am sure you will be mighty glad you did."

How about *your* Payroll Savings Plan? What have you done since Savings Bonds became Defense Bonds? What is your percentage of employee participation?

From coast to coast, companies large and small are installing the Payroll Savings Plan or revitalizing their present plans through person-to-person canvasses which put a Payroll Savings Application Blank in the hands of every employee.

Note the results of some recent person-to-person canvasses. Think what management efforts like this mean to the Defense effort. Then phone, wire or write to Savings Bond Division, U. S. Treasury Department, Suite 700 Washington Building, Washington, D. C. Your State Director will be glad to help you put in a Payroll Plan or show you how to conduct a person-to-person canvass.

Results of recent person-to-person canvasses to increase participation in Payroll Savings

39 companies . . . total employees	487,347*
Employees on plan before canvass	81,481
Employees on plan after canvass	329,942
% of participation before canvass	16.8%
% of participation after canvass	67.7%
New savers added to plan	**248,461**

Based on National averages, employees in this group of companies are saving more than $7,000,000 every month in United States Defense Bonds.

**Includes 62,070 employees of six companies which did not have plan before canvass.*

The U. S. Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the Advertising Council and

THE OIL AND GAS JOURNAL
TULSA 1, OKLAHOMA

EQUIPMENT MEN . . . in the News

Continental Supply Names Personnel Changes

Continental Supply Co. reports that Cooper Vaughn, manager at McAllen, Tex., has been transferred to Alice, Tex., as manager.

M. H. Johnson, formerly of Corpus Christi, Tex., has been appointed manager at the McAllen store.

Both of these points are under the direct supervision of W. E. Young, assistant district manager, Corpus Christi, and N. W. Endicott, vice president, Houston.

Schlumberger Opens Three New Stations

I. E. YOUNG

Schlumberger Well Surveying Corp. has added three new locations to its list of service centers.

On September 16 the company opened a station in Williston, N. D., which is managed by J. E. Young. Young, a member of the Schlumberger organization since January 1948, has worked in Montana and Wyoming districts.

A new location at McCamey, Tex., was opened on September 1 to place equipment near the point of operations. This station is in charge of D. M. Quillan. Quillan has been employed by Schlumberger since February 1949, serving in the Permian basin area.

In the Rocky Mountain area a new station was established on August 27 at Vernal, Utah, to handle the new discoveries and increased exploration of that region. John Rusen has been transferred from Casper, Wyo., to manage this station. Rusen has served in the Rocky Mountain area since his employment in February 1948.

Warner Names Kenny Ontario Representative

Kenny Consolidated Engineering Industries, Ltd., Toronto, Ont., Canada, has been named Ontario representative for Warner Electric Brake & Clutch Co., Beloit, Wis., as reported by Norman K. Anderson, industrial division manager.

The Toronto organization will act as engineering consultants for industrial firms throughout Ontario desiring to install Warner control equipment on any types of machinery.

Otis Pressure Promotes Wyckoff, Waters

H. A. WYCKOFF

W. K. WATERS

Two promotions have been announced by Otis Pressure Control, Inc., Dallas. Harry A. Wyckoff has been appointed superintendent of the Oklahoma City division, and W. K. (Jug) Waters, has been named as assistant to Wyckoff.

Wyckoff joined Otis in 1936, working out of Ada, Okla. He has been dispatched to supervise unusual pressure control jobs from the Gulf Coast area to the Arctic Circle and from California to the Eastern Seaboard.

Waters, before his recent appointment, was employed in the Otis Odessa, Tex., office. Prior to his Odessa assignment he was employed in the company manufacturing plant in Dallas.

Chiksan Names Smith to Eastern Managerial Post

Appointment of L. J. Smith to the newly created position of eastern regional sales manager has been announced by G. R. Winder, vice president and general sales manager of Chiksan Co., Brea, Calif.

Smith's headquarters will be at the company's Newark, N. J., office

L. J. SMITH *G. R. WINDER*

where he has served as a field engineer for the past 4 years.

Before joining Chiksan, Smith was widely known as an aircraft and industrial engineer.

Irrgang Elected Lincoln Executive Vice President

William Irrgang was elected vice president of The Lincoln Electric Co. at a recent meeting of the board of directors.

Irrgang started with Lincoln in 1929 and for the past 23 years has been engaged in various phases of plant operation. For the past 6 years as director of plant engineering, he supervised the improvement in welding-machine manufacturing methods which have been installed in Lincoln's new plant. His department has had charge of the entire plant-engineering project of Lincoln's new factory.

Irrgang came to the United States in 1928, after graduating from the State Technical School, Cologne, Germany, in electrical engineering.

J. R. Coffing Elected Vice President

Coffing Hoist Co., Danville, Ill., has announced the election, by its board of directors, of J. R. (Jim) Coffing as vice president in charge of sales, advertising, and general office administration.

Coffing began with the organization at the age of 12 as clean-up boy and worked his way up through the various departments of production and administration to become general sales manager. He attended University of Alabama.

American Meter Appoints Kiraly to Executive Post

American Meter Co. has announced the appointment of Joseph L. Kiraly as assistant to the vice president in charge of production.

Prior to his association with American Meter, Kiraly was with Stevenson, Jordan & Harrison, Management Consultants, New York, for 9 years as an industrial engineer. He assisted in surveying and installing modern managerial methods covering job evaluation, incentive plans, produc-

tion routines, and payroll - routine plans for a number of large corporations.

Farmer Is Appointed To Engineering Post

R. L. FARMER

Robert L. (Bob) Farmer has recently been named factory sales engineer of General Controls Co., according to J. F. Ray, vice president in charge of sales.

Farmer, an employe of General since 1943, will concentrate on sales engineering in the aircraft field, where most of his work will deal with the company's hi-g line of electrically operated valves, pressure, and temperature controls.

Farmer was recently attached to the Dallas factory branch office, returning to Glendale, Calif., in 1951.

Refinery Supply Co. Reopens Houston Branch

The Refinery Supply Co., Tulsa, has announced the reopening of its Houston branch.

This company is the sole manufacturer of R. S. oil and gas-testing specialties, and also exclusive distributors for the Central Scientific Co. (Cenco).

As far as possible, under present conditions, a complete line of laboratory equipment will be carried.

V. F. Sweeney, Jr., will be in charge of the branch. Formal opening will be announced at a later date.

Baash-Ross Appoints Ross To Head Export Sales

Baash-Ross Tool Co. has announced that its export sales department in New York City is now under the direction of Kenneth S. Ross, formerly with the California division of the company.

After an extensive period of field work with one of the major drilling contractors, Ross joined the Baash-Ross organization in the Los Angeles plant. He worked up through various departments of the organization, and was then transferred to the Bakersfield and San Joaquin Valley where he has been located until his recent promotion.

Ross will make his headquarters in New York City, where all Baash-Ross export operations are centralized.

Gallagher Made District Manager by Buckeye

P. J. GALLAGHER

R. B. Straker, president of Buckeye Supply Co., recently announced the appointment of Paul J. Gallagher as district manager of the company's midwest division.

Gallagher joined the Buckeye staff in 1950. He was formerly associated with Wickwire-Spencer Steel Co. for 7 years, and with Jones & Laughlin Steel Corp. for 5 years. He will make his headquarters at Buckley's El Dorado, Kans., store.

Stentz Equipment Expands Permian Basin Activities

Stentz Equipment Co. has recently expanded its sales organization to include offices and warehouse facilities in the Permian basin of West Texas. Al W. Tweelings, who was formerly with Gulf Oil Corp. as petroleum engineer, has been appointed district manager.

Tweelings received his engineering degree from University of Minnesota. His previous oil-field experience included work on geophysical, production, and pipe-line operations, prior to his petroleum-engineering experience with Gulf.

Stentz Equipment's warehouse is located in Odessa, Tex., where complete stocks of equipment will be carried, in addition to SECO production and pipe-line products. Other Mid-Continent sales and service headquarters are maintained at Houston, Dallas, and Tulsa.

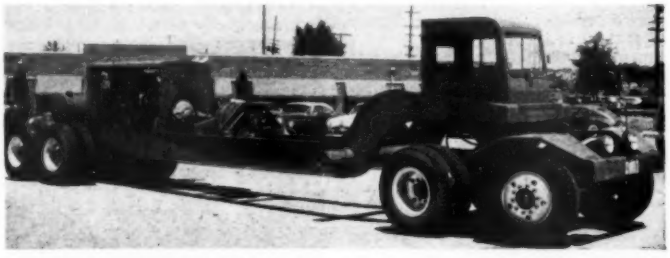
Avondale Builds Super Tug for Socony-Vacuum

An eventful ceremony at Avondale was the christening on October 10 of the super tug Socony II, built by Avondale Marine Ways, Inc., for Socony-Vacuum Oil Co., Inc., of New York. The tug is scheduled for use in the New York Harbor area and for coastwise towing, and will leave, after commissioning, on her maiden voyage to New York.

Additional characteristics of interest are the fuel-tank capacity of 27,300 gal. and a 2,000-gal. fresh-water tank which afford a cruising range of 7,500 miles. Tug has a net tonnage of 100 tons and has a tow-line pull of 50,000 lb.

The Socony II, of all-welded steel construction, is of the conventional type and was designed by Socony engineers. Of particular interest is the extra-heavy hull plate of 5/16-in. thickness used below the water line and the double strip in the bow which were also provided for ice breaking.

Oil Well Servicing Unit Built for Franks



Unusual in appearance and design, this portable oil well-service unit, a combination full trailer and semitrailer, is one of the latest products of Kenworth Motor Truck Corp.'s specialized engineering to meet specific problems. It was built in Kenworth's Seattle factory for Franks Manufacturing Co., of Tulsa. The power unit and controls are mounted on the full trailer at the rear; the cab and steering wheel are mounted on the front semitrailer, and it is powered with a two-cycle diesel engine. Franks added well-servicing equipment to the 38-ft. chassis, which consists mainly of a hinged tower that can be raised and lowered hydraulically in much the same fashion that a fire-truck ladder is handled.

Your MARKET PLACE FOR THE OIL AND GAS INDUSTRY... CLASSIFIED ADVERTISING

UNDISPLAYED CLASSIFIED 12c a word one issue. 10% Discount three or more issues. $3.00 minimum charge. Blind Box in our care counts nine words. Payable in Advance.

DISPLAY CLASSIFIED
$12.00 a column inch one issue . . .
10% Discount three or more issues.

EQUIPMENT FOR SALE

ADDING MACHINES, Typewriters wholesale. Enclose 10c for catalogues. Apple, 993A, Westchester Ave., New York City 59, N. Y.

FOR SALE: Model 61 Wichita Spudder, complete with 150 H.P., LeRoi Drilling Engine, all tools, dog house, light plant, and Shear Pole Mast. Rig is mounted on 12" I Beam Skids. Located in West Texas. Box E-415, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: Seamless casing and tubing new and second hand. Phone Rogers Pipe and Supply Co., Tulsa, Okla.

FOR SALE: Two 3000 bbl. Butler bolted tanks good condition. Can ship immediately. Wentz Fuel Oil Company, 1012 No. 16th St., Lincoln, Nebraska.

FOR SALE: One Bucyrus-Erie 36 L Spudder three and one-half years old. Complete top and bottom tools 15½ to 51½. Also complete tailing in tools. All in first-class condition. List on request. J. E. Griggs, 310 East Third St., Mt. Carmel, Illinois. Phone 959.

NEW Seamless Line Pipe—1500 metric tons 2.375" o.d. and 4½" o.d. to API specifications. New welded Line Pipe—6000 metric tons 20" to 30" API monogram and to API specifications. New Welded Line Pipe—4½" up to API specifications. Box E-443, The Oil and Gas Journal, Tulsa, Oklahoma.

SPECO TOOL COMPANY

Oil Field Maintenance & Repair Machine Shops

We buy and sell all types of used oilfield equipment.

Salem, Ill. Phone 915 — **Crossville, Ill.** Phone 841

50,000 Feet 2" STANDARD BLACK PIPE

Prime, pressure tested.

Single and double random lengths. Plain Ends.

Immediate Delivery.

Subject to prior sale.

Write—Wire—Phone

SONKEN-GALAMBA CORPORATION
2nd and Riverview (X-779)
Kansas City 18, Kansas
THatcher 9243

EQUIPMENT FOR SALE

USED ROTARY AND CABLE TOOL DRILLING TOOLS, WIRE LINES, E. A. KELLY, BOX 861, OKLAHOMA CITY. PHONE 5-6407.

ONE Cardwell Double Drum Draw Works, R.L. 605 powered with W.A.K.U. Waukesha Motor Serial No. 731319. One 5" x 10" Gaso pump, Serial No. 16305, powered with Climax motor Serial No. 14423. One 4 way manifold complete. One 3 shiv booster traveling block. One 7 in. Cameron Blowout Preventer. One Franks swivel and 3" x 36' Kelly. One 96' Steel drilling mast. One 7' x 16' x 24' Steel sub-structure. One ⅝" x 8500' sand line. One ⅞" x 1500' drilling line. One steel tool house & complete set of tools. Rig now working. Phone 1391, B. M. McGraw, Seminole, Oklahoma.

FOR SALE: Complete Rotary Rig and equipment, 4000' of 4½" Drill. L. C. Moore Jackknife Derrick. Wilson Draw-works. 7¼"x12" FXZ G&D Pump. 3 D 13,000 Cat. Engines. Located in Kansas. $45,000. Milford Giffin, Giffin Hotel, Hoisington, Kansas.

Gaso Duplex 4½" x 6" Power Pumps with Chrysler C-36 Engines, skid mounted, immediate delivery. Also Byron Jackson, Carter Centrifugal Units. Westinghouse 20-25-50 KW Generating Units.

H. H. COFFIELD
Attn.: W. H. ORR
Phones: 132—Rockdale, Texas
AT-3437—Houston, Texas

EQUIPMENT FOR SALE

PIPE

ALL SIZES; LINE PIPE AND CASING, TANKS, AND OILFIELD SUPPLIES. EDCO PIPE & SUPPLY CO., PHONES 833 OR 1298, DRUMRIGHT, OKLA.

FOR SALE: 87 ft. telescoping rotary drilling mast complete with steel sub base. Terms. Melton Supply Company, Seminole, Oklahoma.

FOR SALE: Redwood Oil Tanks. One six hundred barrel. One 500 barrel. One three hundred barrel gun barrel. Two two hundred and fifty barrels. One one hundred barrel. Call or write P. C. Dressler, McLouth, Kansas.

FOR SALE: Mayhew 2000 drill. Has dug 15,000 ft. of hole. This rig like new. Price $5,000 under new price. Special slips, special weight indicator, sand line drum, new 337 cu. in. 145 HP Ford industrial auxiliary motor. Drill also operates from truck motor. Mounted on 6x6 GMC. Clemens Exploration, Princeton, Ind.

FOR SALE

1 Good Used 136' Ideco Derrick with Substructure and 350 Oilwell 6 Sheave Crown. Almost New. Priced for Quick Sale.

BEACON SUPPLY COMPANY
Box 398, Pampa, Texas **Ph. 3377**

SPECIAL OFFERING

NEW LINE PIPE

20,000'	2" New Standard Black Plain End Pipe
6,900'	2½" New Standard Black Plain End Pipe
90,000'	3" New Standard Black Plain End Pipe
2,500'	3" New Standard Galvanized Plain End Pipe
2,000'	4" New Standard Black Seamless Plain End Pipe
10,000'	10" OD x .134" Wall, 14.6#, E.W., 484# P.S.I.

OIL WELL CASING & TUBING

25,000'	1" (1.315" O.D. x .133" Wall) 1.8# New Seamless Oil Well Tubing (Jet) T&C with long Tubing Collars and Threads for Jet purposes.
45,000'	2⅜" O.D. 4# Good Used Lapweld T&C Tubing
15,000'	5½" O.D. 14# Good Used Lapweld T&C, 11½ V-Thread Casing
2,700'	7" O.D. 17# Good Used Seamless T&C, 10 V-Thread Casing
11,000'	8⅝" O.D. 24# Good Used Lapweld T&C, 8 V-Thread Casing

OTHER SIZES RANGE FROM ¼" TO 36" O.D.

IMMEDIATE DELIVERY—SUBJECT TO PRIOR SALE

NEW AND USED CASING, TUBING, LINE PIPE & SEAMLESS TUBING

FOR FULL DETAILS, WIRE OR PHONE AT ONCE

A. J. STRUBEL, Broker

4946 Murdoch, St. Louis Mo. Sidney 1791 (Day Phone) HUdson 8152 (Night Phone)

EQUIPMENT FOR SALE

KEYSTONE spudder, trailer mounted, truck and tools. Located Washington County, Oklahoma. Working on seven hundred foot well. Box E-385, The Oil and Gas Journal, Tulsa, Oklahoma.

SPUDDERS, BUCYRUS, Wichita, Fort Worth, also rotaries and core drills. Good used equipment, tools, pipe, cable. Everything for well drilling. Fishing tools rented. Pressey & Son, Pueblo, Colorado.

FOR SALE—L. C. Moore 2 drum all steel Spudder, Telescoping A Mast, Six cylinder Hercules Motor, Steel Doghouse and small Tools, Drilling and Sand line. $7250.00. Milford Giffin, Giffin Hotel, Hoisington, Kansas.

NEW AND USED PIPE

10,000′ 3″ Used lapweld line pipe
15,000′ 18″ O.D. 5/16 wall No. 1 Used Lapweld P.E. line pipe
10,000′ $2^7/_8$″ O.D. 6.40 lb. Non-upset J-55 Range 2 New A.P.I. Seamless Tubing

FRANK MORRIS & CO.
424 So. Cheyenne Phone 2-6248
Tulsa, Oklahoma

FOR SALE

10,000—$6^5/_8$″ OD 8 Thread Standard Recessed Line Pipe
Couplings at $1.50 each.

3,000—$8^5/_8$″ OD 8 Thread Standard Recessed Line Pipe
Couplings at $2.25 each.

All couplings are clean and in perfect condition.

OIL FIELD SALVAGE COMPANY
Breckenridge, Texas
Phone 232 P. O. Box 812

NEW
HIGH PRESSURE HOSE

Perfect Condition

6 inch diameter, 20 ft. long. Heavy duty with standard built-in nipples and standard 6 inch flanges at each end.

Price $200.00 each*

4 inch diameter, 30 ft. long. Heavy duty with brass couplings.

Price $200.00 each*

This is choice material, neoprene and inner steel coil, and is recommended for immediate and future use. At the above price it will not be available at less than three times our price when our present stock is exhausted. Right now you can get any quantity up to a carload.

A few 6″ with aluminum nipples and flanges at $250.00 each.

*F.O.B. New Orleans

G. Peters

430 Dauphine St.

NEW ORLEANS 16, LA.

EQUIPMENT FOR SALE

AS IMPORTERS of Steel we can furnish you with European or Japanese Steel Products of all types. Let us have your inquiries. Hemisphere International Corp., 1404 Hibernia Bank Bldg., New Orleans, La.

FORT WORTH Jumbo Spudder with or without tools. No Engine. Near Oilton, Oklahoma. Just finished 3000 ft. hole. Priced to sell. Doak Drilling Co. Write or Phone, 1579 Bristow, Oklahoma.

PUMPING OUTFITS. Practically new 5x10 Worthington KMS Pumps mounted on steel skids with 140-GKU Waukesha Engines complete with drive. G&H Supply Co., P.O. Box 4052, Oklahoma City. Phone 62-7886.

CUMMINGS Diesel Motor, 150 H.P. in first class condition. Bargain for cash, or will trade part payment on used jackknife derrick. Transco Gas and Oil Corporation, 200 North Third Street, Albuquerque, New Mexico.

PIPE LINERS—3800—6″ Short Dresser Couplings w/ Bolts Less Gaskets. 1,500 Available for Immediate Delivery. Printy Pipe & Supply, Cut Bank, Montana.

7500′ of API Full Hole $4^1/_2$″ Drill Pipe. Graded by Sonoscope engineers. Approx. OD of joints $5^1/_2$″. $2.50 per ft. Milford Giffin, Giffin Hotel, Hoisington, Kansas.

ONE portable Franks Spudder, complete with 5″ tools, some 7″ tools and all tubing and rod tools. Priced to sell. Sole Drilling Co., C/o W. F. Banks, Box 297, Ellinwood, Kansas. Phone 106.

FOR SALE: One super model Wilson single drum servicing unit, 80 hp. Waukesha. 4,000′ wire, all tubing tools, mounted on GM 4-wheel drive truck. $3500. Phone Rogers Pipe and Supply Co., Tulsa, Okla.

FOR SALE: "300-A" Sullivan drilling rig, 65′ derrick, 2-Buda L-525 motors compounded, 7x10 Mud pump, all mounted on tandem trailer. 3,000 ft. of extra good $3^1/_2$ EUE drill pipe, 6.6″ drill collars, tongs, kelly, swivel, pipe racks, dog-house, Kohler light plant. Complete rig now working on 2,700 ft. wells in West Texas. Price complete with C-50-T Autocar truck to pull rig $38,000.00. Del Rio Drilling Company, P.O. Box 1022, Del Rio, Texas.

WANT EQUIPMENT: Did you find the equipment you wish to purchase in this column? If not, use an "Equipment Wanted" classified advertisement to find it. It is available somewhere and Journal classified advertisements will find it. See box heading for classified rates, or write The Oil and Gas Journal.

PRESSURE VESSELS

10,500 gal. 9′x23′x$^1/_2$″, 150 PSI.
10,400 gal. 7′x37′, 300 PSI test.
8,200 gal. 6′x40′x2″, 390 PSI.
3,500 gal. 5′x23′x$^3/_4$″, 200 PSI (2).
2,000 gal. 5′x14′, 106 PSI.
1,250 gal. 3′10″x14′, 106 PSI.
1,200 gal. 3′10″x13′9″, 106 PSI.
1,050 gal. 3′10″x11′9″, 125 PSI.

STAINLESS STEEL TANKS

3,000 gal. 5′x21′6″x$^1/_4$″ Type 430.
2,300 gal. 5′x16′x$^1/_4$″ Type 304

TANKS

15,300 gal. 9′x32′x3/16″.
2,100 gal. 9′x3′6″x3/16″ cone bottom (2).
1,600 gal. 8′x7′x3/16″ (2).
1,100 gal. 5′x7′8″x$^1/_4$″.

TANK CAR TANKS

6,500 gal. 76″x26′7″, shell 11/16″ & 5/16″.

→ SEND FOR OUR BROCHURE ←

HEAT & POWER CO., INC.
70 Pine St., Hanover 2-4890, New York 5
Machinery & Equipment Merchants

LEGAL BLANKS

BURKHART LEGAL BLANKS since 1908 Oil-Gas (all states), Business, Real Estate, Legal Forms, Leases, Revised With Government Regulations, Commercial Printing Catalog and Samples on request. Burkhart Printing & Stationery Company, 118 South Cincinnati, Tulsa 3, Oklahoma

EQUIPMENT WANTED

WANTED: Triplex Type Pumps, minimum 500 barrels per day capacity at 1,000 PSI and 0 to 10 PSI suction and up. 1″ Regular Black Line Pipe; 1″ long collar line pipe and $1^1/_4$″ upset tubing. Must be in good condition. Lynch Oil Company, P. O. Box 614, Evansville, Indiana.

WANTED: Complete portable or semiportable gasoline plant to handle two million feet per day, 300 pound discharge pressure. Also direct driven 600 HP compressor. Box E-450, The Oil and Gas Journal, Tulsa, Oklahoma.

WE BUY drilling equipment, machines, cable tools, pipe, etc. Turn your surplus equipment into cash. Pressey & Son, Pueblo, Colorado.

EQUIPMENT NOT IN USE: Did you find a buyer in this column for the equipment you have for sale. Someone wants it and an "Equipment For Sale" classified advertisement in the Journal will find a buyer. See box heading for classified rates or write The Oil and Gas Journal.

WANTED

6″
STANDARD PIPE
P.E. or T & C
In Trade for Other Sizes
What Have You?

CENTRALIA PIPE & SUPPLY CO.
Phone 6771
218 W. Calumet St. Centralia, Ill.

NEW

$8^5/_8$″ and $10^3/_4$″ O. D.
A.P.I. 8 Rd. Thread
Regular Casing Collars

WILL SWAP FOR

$7^5/_8$″, $9^5/_8$″, $11^3/_4$″ and $13^3/_8$″ O.D.
New long or regular 8
Rd. Thrd. Casing Collars
On Pound-for-Pound Basis
Call, Wire or Write

Centralia Pipe & Supply Co.
Phone 6771
218 W. Calumet Centralia, Ill.

HELP WANTED

MANUFACTURER'S AGENT for Eastern U. S. To contact refineries and utilities throughout U. S. Man sought has wide acquaintanceship with operating personnel of East Coast refineries, particularly in areas from Philadelphia to Boston. This is an important opportunity on a competition free item. Address in confidence Box E-454, The Oil and Gas Journal, Tulsa, Oklahoma.

HELP WANTED

RELIABLE oil company desires thoroughly experienced production superintendent for East Texas oil field. Salary commensurable with that paid by other companies for like work. Reply to: Box E-435, The Oil and Gas Journal, Tulsa, Oklahoma.

RESEARCH Engineer — 26-40 — B.S., and preferably an advanced degree in petroleum or mechanical engineering. Must be widely experienced in well completion practices. Will be responsible for research program in well completion practices and well mechanics. Salary open. Location — Ponca City, Oklahoma. State age, experience, education, and salary desired in opening letter. Write direct to Personnel Records Division, Continental Oil Company, Ponca City, Oklahoma.

KEY Seismograph Personnel Needed by Established and Expanding Seismograph Company. Box E-264, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM Engineers having 1½ or more years well work experience. Geologists under 3 years experience having 1 year graduate work or 50 semester hours geologic courses. Experimental geophysicists. Excellent employer. No fees. Oil Industry Employment Service, 405 Tuloma Bldg., Tulsa, Okla. 4-5974.

RESEARCH Group Leader and Research Engineer — 26-40 — B.S., and preferably a Ph.D. in physical chemistry, physics, petroleum engineering, or chemical engineering. Should have experience in reservoir engineering, reservoir mechanics research, or fluid flow research. Will be responsible for research program in multiphase flow and other aspects of reservoir mechanics. Salary open. Location—Ponca City, Oklahoma. State age, experience, education, and salary desired in opening letter. Write direct to Personnel Records Division, Continental Oil Company, Ponca City, Oklahoma.

Important New York investment firm, which has already very substantial oil interests, wants first-class geologist or petroleum engineer with good judgment and aptitude to understand financial aspects of oil business. Would consider applications coming from men having held responsible positions with banks, oil companies or oil consultants. Would pay good salary and good opportunity according to talent. Our staff knows of this offer.

Box E-442
THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

MANAGER OF ENGINEERING
Earning $15,000 or More

Position of exceptional opportunity with growing chemical engineering firm in New York specializing in chemicals and chemical process industries.

Responsibilities will include supervision of complete engineering, drafting, and equipment design activities, reporting directly to vice president.

Must be a real executive and leader who has wide experience in execution of detail plant design and handling of personnel, but young enough to have energy and imagination.

Reply in confidence, giving fullest details as to experience, salaries, personal data and qualifications.

Box E-455, The Oil and Gas Journal, Tulsa, Oklahoma

HELP WANTED

WANTED BY SEISMOGRAPH COMPANY
IMMEDIATE EMPLOYMENT
ATTRACTIVE SALARIES

Openings for Party Chief capable of interpretation of seismic data, Computers, Surveyors, Observers, and Shooters. Box E-449, The Oil and Gas Journal, Tulsa, Oklahoma.

RESEARCH Metallurgist—26-40—B.S., and preferably advanced degree in metallurgy or metallurgical engineering. Should have experience with all types of laboratory apparatus for metallurgical study and experience in selecting materials for all types of services. Corrosion studies, materials selection, and anlysis of failures will constitute the bulk of the work. Salary open. Location—Ponca City, Oklahoma. State age, experience, education, and salary desired in opening letter. Write direct to Personnel Records Division, Continental Oil Company, Ponca City, Oklahoma.

WANTED: Engineer with natural gasoline plant or recycle plant experience in process design. Location, Fort Worth office of expanding progressive independent oil company as assistant to Chief Engineer. State salary expected. Give experience, age, family, etc. Information held confidential. Box E-424, The Oil and Gas Journal, Tulsa, Oklahoma.

A CHEMIST—Major Oil Company Refinery in Oklahoma. State qualifications and salary expected. Write Personnel Department, Box 381, Tulsa, Oklahoma.

WANTED—Refinery instrument man. Cat cracking experience necessary. New Mexico Asphalt & Refining Company, P. O. Box 367, Artesia, New Mexico.

ENGINEERS, Executives, Technical Men. Salaried positions—$3600 to $30,000. This confidential service for outstanding men who desire a change of connection. Will develop and conduct preliminary negotiations without risk to present position. Send name and address for details. Tomsett Associates, 334 Frick Bldg., Pittsburgh 19, Pa.

PETROLEUM GEOLOGIST

Wanted by Seaboard Oil Company in District Office, Man 25-34 with a minimum of 3 years oil experience in Corpus Christi area. Write direct to Personnel Department, 1400 Continental Building, Dallas, Texas, giving complete educational and business background and salary expected. Enclose photo if possible.

EXPANDING program provides excellent opportunity for a few experienced Seismic Party Chiefs for foreign and Canadian assignments. Applicants should have not less than three years' experience in capacity of Party Chief, be proficient in interpretation, and have proven ability to administer crew. Liberal compensation based upon competence. United Geophysical Company, Inc., Bin M, Pasadena 15, California.

GEOLOGIST

with Oklahoma experience wanted by active independent operator. Oklahoma City headquarters. Excellent salary. Outline education and experience in detail. All replies strictly confidential.

Box E-440
THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

HELP WANTED

NATIONALLY known manufacturer of oil field specialties has opening for commission representative in Michigan, Ohio, Pennsylvania and West Virginia. Products are marketed only through recognized jobbers but contact with both jobber and consumer is necessary. Representative must be of highest caliber and must be well established in area. Box E-431, The Oil and Gas Journal, Tulsa, Oklahoma.

THE POSITION YOU WANT: Oil industry companies are looking for men to fill every conceivable kind of position. If you didn't find the position in this column that you are looking for, use a "Situation Wanted" classified advertisement to state your qualifications. Some company is probably looking for your ability. See box heading for classified rates or write The Oil and Gas Journal.

SITUATIONS WANTED

FORMER Independent Oil Operator ten years, with legal education, plus eight years Wall Street experience, desires connection raise funds exploratory well drilling from excess profits taxpayers. Box E-396, The Oil and Gas Journal, Tulsa, Oklahoma.

EXPERIENCED petroleum Chemist wants position, Research, supervision or control. Box E-433, The Oil and Gas Journal, Tulsa, Oklahoma.

ATTENTION: Well established oil well drilling contractor desires to manage and supervise: Individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas, and New Mexico. Personal interview by appointment is desired. Makin Drilling Company, Box No. 131, Ph. No. 131, Hobbs, New Mexico.

ENGINEER Available to Manage Refinery. Box E-430, The Oil and Gas Journal, Tulsa, Oklahoma.

FORMER Office Manager-Oil Accountant for large Independent Operator desires connection with Independent. Heavy experience land and lease work. Capable assuming full responsibility. Age 39, marrried, reliable and steady. Appreciate interview. Box E-439, The Oil and Gas Journal, Tulsa, Oklahoma.

EXPERT material man offers twenty-six years experience including inventory control, stock analyses, warehousing, purchasing, etc., in both Foreign and Domestic service. Box E-436, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM Engineer, married, 4 years experience in production, completion, purchasing, supervising on Gulf Coast and West Texas. Desires change, stateside or foreign. Box 1103, Freeport, Texas.

GEOLOGIST, with extensive experience in oil and gas exploratory work, in foreign as well as domestic fields, for major as well as independent oil companies; doing surface, detail and reconnaissance, and subsurface work. Considerable administrative as well as geological survey experience. Wishes connection or position. Will go anywhere. Box E-425, The Oil and Gas Journal, Tulsa, Oklahoma.

GRADUATE Petroleum & Mechanical Engineer desires domestic or foreign supervisory position in refining maintenance, inspection, Mechanical or operating fields. Age 32, married with children, seven years domestic and Foreign experience refining operation, maintenance, equipment and welding inspection, corrosion engineering, and cathodic protection designing. Box E-453, The Oil and Gas Journal, Tulsa, Oklahoma.

REFINERY ENGINEER: 5 years experience in furnace and refinery equipment design and operation in technical and engineering service sections of major refinery. Desires similar work in responsible capacity with small refinery. Box E-452, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST

Twenty-five years experience. Texas-Louisiana Gulf Coast. Subsurface geology and well completions. Interested in position with oil company, independent operator, or drilling contractor-produeer. Box E-438, The Oil and Gas Journal, Tulsa, Oklahoma.

BLAW-KNOX CONSTRUCTION CO.

Opening on staff for qualified process Design Engineers. Three to five years industrial or contracting experience with refinery processing units required. Also opening for Cost Estimators. Position is in the Tulsa Office which is an aggressive, rapidly expanding organization. Unlimited opportunities to do engineering work on all types of processes. Outline technical training, experience, age, present position, and salary desired. Include recent snapshot if available. Send letters to:

Personnel Department
Chemical Plants Division
540 East Fifth Street, Tulsa, Oklahoma

SITUATIONS WANTED

PETROLEUM ENGINEER: 2 years experience in drilling, production, and workover operations; 2 years experience in reservoir engineering and evaluation. Presently employed. Desires to become affiliated with independent operator. Box E-451, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEER, ten years experience in drilling, production, reservoir, and secondary recovery work desires connection with small company. Box E-448, The Oil and Gas Journal, Tulsa, Oklahoma.

MECHANICAL, '42 Graduate, now employed. Staff, construction, and maintenance engineering experience in refining. Seeks permanent position having advancement possibilities with Midwest or Southwest Refiner. Box E-446, The Oil and Gas Journal, Tulsa, Oklahoma.

TWENTY YEARS' experience refinery superintendent and manager. Desire connection with independent refinery. Box E-456, The Oil and Gas Journal, Tulsa, Oklahoma.

THE RIGHT MAN: Can you fill the position you have open from the qualifications listed in this column. Men are always looking for an opportunity to improve themselves. Use a "Help Wanted" Journal classified advertisement to find the men you need. See box heading for classified rates or write The Oil and Gas Journal.

FOR SALE—MAPS

NORTH DAKOTA and South Dakota Base Maps—County outline, Township and Range, location of wells and Operators name with total depths. Oil and Gas Fields. 1" — 8 miles. Price $5.00 each. County Maps: Fee ownership and lease with expiration dates. Scale 1" — 4,000 ft. Northwest Mapping Co., 117½ Fourth St., Bismarck, North Dakota.

NEW Williston Basin Map—Montana, Wyoming, North and South Dakota, North Nebraska, Western Iowa and Minnesota—15 miles to 1 inch—showing all townships and ranges—all wildcat activity in each state—size 42" x 48"—price, paper $10.00, cloth $17.50—address all orders and make checks payable to D. A. Austin Company, Commercial Standard Building, Fort Worth 2, Texas.

REAL ESTATE

SPACE IS NEEDED: A Journal display classified advertisement is the quickest way to rent or sell your real estate. In the present period of expansion oil industry firms urgently need the space you have available. If it isn't listed here, you may also find it by stating your needs in these pages. For classified rates see box heading or write The Oil and Gas Journal.

WILL TRADE

Good income producing property in business section of suburban Chicago. Gross income $8500.00 per year, can be increased to $17,680.00. Will trade for production deal with sufficient drilling sites. Owner, J. L. Waters, Rm. 1835-11 S. LaSalle St., Chicago, Ill.

BUSINESS OPPORTUNITIES

RAISE CAPITAL — For oil and mining propositions. Have high-class mailing lists of investors. W. Kyle, 1006 Dallas Ave., Houston, Texas.

WANTED RELIABLE party with capital to develop oil, on Geophysical and Geology prospect in North Texas. P. O. Box 1016, Wichita Falls, Texas.

WANT
N. Y. EXPORT REPRESENTATION?

Long established and well known oil well equipment manufacturer who has maintained N. Y. export office and sales personnel for many years, is now in a position to handle additional representation in New York for high quality manufacturers of oil equipment items. If you're looking for increased export business, write for further information. All replies held in strict confidence.

Box E-359, The Oil and Gas Journal, Tulsa, Oklahoma

ROYALTIES

MONTANA ROYALTIES

Millions of acres now leased by world's major companies, with huge drilling play in prospect. For booklet describing Montana geology and oil development, write Landowners Royalty Company, Box 1228 Great Falls, Montana.

OWNERS want to sell part royalty 2560 acres Texas; 240 acres Lea County, N. M., lease; 480 acres California lease. C. W. Deming, Waycross, Ga.

GET TOGETHER: Both Capital and Royalties are available. If the investment proposition you want isn't listed in this column, use a Journal classified advertisement to find it. See box heading for classified rates, or write The Oil and Gas Journal.

LEASE AND DRILLING BLOCKS

FOR SALE: Settled production in Kentucky. 5 Bbl. Six wells, one gas well, one gas injection well. Depth 360 ft. Proven locations to drill. Ideal for flooding. To be sold at equipment cost of $10,500. C. A. Krohn, Plymouth, Wisconsin.

I HAVE 10,000 acres on Magnetomer and Gravity High in South Georgia. I can supply geophysical maps on this acreage to party interested in drilling deal or finance a drilling program. Wildcat acreage on good structure, gas and oil seepage, open for deal to use some **tax money** with excellent chance for shallow production. T. R. DAVIS, 700 Mosley Street, Vidalia, Georgia.

UNIT No. 1: N½SE¼, SW¼SE¼ of Section 14, Township 3-North Range 1-West, containing 120.00 acres, more or less, the same being within the ceded portion of the Shoshone or Wind River Indian Reservation, Fremont County, Wyoming. Unit No. 2: NE¼ of Section 14, Township 3-North, Range 1-West, containing 160.00 acres, more or less, the same being within the ceded portion of the Shoshone or Wind River Indian Reservation, Fremont County, Wyoming. Brinkerhoff Drilling Co., 804 Continental Bldg., Dallas 1, Texas.

CAPITAL immediately available for geologically attractive Drilling deals and oil producing property. Send full particulars. Box E-434, The Oil and Gas Journal, Tulsa, Oklahoma.

LEASES ROYALTIES
Producing and Nonproducing
Bought and Sold—Any Area
Inquiries Invited

B. D. BUCKLEY
6635 Delmar Ave., St. Louis 5, Mo.

$1,500,000 OIL PRODUCTION

Group of partially developed leases with many producing wells and proven undrilled offset locations presently earning substantial income. Production may be quickly increased by additional drilling. Properties completely equipped and in full operation. Engineers estimate large future recovery, deeper pay possibilities and high potential value. Fine nucleus for independent oil company with enticing dividends from start. Will stand rigid investigation. Details and engineer's report available to qualified parties.

ARTHUR DAVIDOR
1412 NW 38th St., Oklahoma City, Okla.

WANTED
OIL INTEREST

I am in a position to furnish oil country tubular goods: casing, tubing, etc., for interest in well for depth up to and including 6,000 ft. Wire or call collect your offer to

DAVID A. SCHLACHTER
6105 Del Norte Lane, Emerson 6026
DALLAS, TEXAS

LEASE AND DRILLING BLOCKS

INTERESTED in drilling several wells not over 4,000' in North Texas by December 15th. Give complete description and full details, Box 4343, Dallas, Texas.

WILL pay cash instantly for leases (large blocks), royalties, mineral deeds, production. Write fully—P. O. Box 2153, Denver, Colorado.

LOOKING FOR A LEASE? There will be over 40,000 wells drilled this year. If you are looking for a lease, drilling block, or drilling deal and haven't found it in this column, or if you have a lease or drilling block you want drilled, a Journal classified advertisement can find an interested party. See box heading for classified rates, or write The Oil and Gas Journal.

GEOPHYSICAL SERVICE

GEOLOGY of the Magic Circle, Daniel E. Willard, Kansas, Nebraska, Iowa, Missouri, Oklahoma; send check $5.00, Magic Circle Educational Foundation, Yates Center, Kansas.

LEASE SERVICE

RECORD TAKE-OFF, available. Listing all Oil leases and assignments as recorded in Grant County, at Carson, North Dakota. Giving complete information. Also monthly continuations made. Write P. O. Box 344, Carson, North Dakota.

GIFTS

GIVE FOR XMAS

SMALLEST, prettiest Miniature Tri-Cone Rock Bit made. Less than one-half inch diameter. Cones turn, will not come out. Gold or nickel plate. On tie chain clasps, ladies' lapel pins, strap type for watch fobs and ring type for charms.

Nickel plate $4.00
Gold plate $4.50

Lots of 12 or more $1.00 less per bit. Check, Money Order or C.O.D.

H. McGAUGHEY
P.O. Box 11063, Houston, Texas

Cooper-Bessemer Adds To Seattle Office

E. D. VAN FOSSEN

The appointment of Edward D. Van Fossen to Cooper-Bessemer Corp.'s regional field office in Seattle has been announced by Stanley E. Johnson, vice president. Van Fossen will concentrate his efforts in furthering Cooper-Bessemer's engineering service to users of heavy internal combustion engines, pumps, and compressors in the northwest sector of this country.

Van Fossen has been associated with Cooper-Bessemer for the past 3 years at its main plant in Mount Vernon, Ohio.

ADVERTISERS

Air Reduction Magnolia Company 178
Allis-Chalmers Mfg. Co. 15, 55
Altens Foundry & Machine Works 206
American Blower Corp. 213
American Cable Division of American Chain & Cable Co., Inc. Inside Back Cover
American Car and Foundry Company 7
American Iron & Machine Works Co. 162
American Locomotive Company 78
American Telephone & Telegraph Co. 38
Anderson Co., The V. D. 233
Armstrong Bros. Tool Co. 193
Associated Oil Field Rentals, Inc. 173
Atlas Chain & Mfg. Co. 227
Axelson Manufacturing Company 195
B and W, Incorporated 203
Baird Mfg. Co. 204
Baker Mfg. Co., The 28
Baker Oil Tools, Inc. 104, 214, 219
Baroid Sales Division, National Lead Company 16
Bendix Aviation Corporation 23
Bethlehem Supply Co. 147
Bonney Forge & Tool Works 63
Briggs & Stratton Corp. 92
Broderick & Bascom Rope Co. Back Cover
Bucyrus-Erie Co. 56
Byron Jackson Co. 8, 233
Cameron Iron Works, Inc. 158, 159
Cast Iron Pipe Research Association 197
Century Electric Company 50
Cessna Aircraft Co. 9
Chapman Valve Mfg. Co., The 25
Chase Brass & Copper Co. 54
Chemical Construction Corporation 57
Chicago Bridge & Iron Company 119
Chiksan Company 209
Chrysler Corporation, Industrial Engine Division 39
Classified Advertising 241, 242, 243, 244
Claymont Steel Corporation, Subsidiary of The Colorado Fuel and Iron Corporation 99
Cleaner Pipelines Co. 196
Cleveland Trencher Company, The 195
Continental Supply Co., The 51, 52
C-O-Two Fire Equipment Company 211
Crane Packing Company 150
Crose Manufacturing Co., Inc., M. J. 196
Cummins Engine Co., Inc. 71
Curtin & Co., W. H. 213
Dallas Manufacturing & Sales Company 197
Darling Valve and Mfg. Co. 59
Davis Regulator Co. 201
Dean Brothers Pumps, Inc. 209
Delta Engineering Sales Co. 199
Drilling & Service, Inc. 228
Duff-Norton Mfg. Co. 212
du Pont 1
Edwards Wire Rope 11
Electric Auto-Lite Co., The 226
Elliott Company 58
Emsco Derrick & Equipment Co. 51,52
Erie Meter Systems, Inc., 225
Fairbanks, Morse & Co. 2
First National Bank & Trust Co. of Tulsa, The 216
First National Bank in Dallas 60
Fisher Research Lab., Inc. 204
Fluor Corporation, Ltd., The 143, 190
Foster Wheeler Corp. 17, 19
Four Wheel Drive Auto Co., The 43
Foxboro Company, The 42
Fuller Company 20
Fulton & Company, R. H. 192
General American Transportation Corporation 100
General Electric Company 223
Geograph Company, Inc., The 209
Gilmer Company, L. H. 185
Globe Oil Tools Company 202
Globe Steel Tubes Co. 31
Goulds Pumps, Inc. 215
Grancell, I. H. 217
Grant Oil Tool Co. 160
Graver Tank & Mfg. Co., Inc. 67
Guaranty Trust Company of New York 157
Guiberson Corporation 141
Gunite Concrete & Construction Co. 200
Halliburton Oil Well Cementing Co. 6
Harrisburg Steel Corporation 187
Hill, Hubbell and Company, Division of General Paint Corporation 174
Houston Contracting Company 186
Houston Ready-Cut House Co., Inc. 214
Huey & Co., S. E. 196
Hughes Tool Co. Front Cover
Inferno Company, The 194, 200
International Harvester Co. 122
International Nickel Company, Inc., The 90
Jacobson, E. C. 222
Jenkins Bros. 45
Johns-Manville Corporation 44, 69
Johnson Gear and Manufacturing Co. 215
Johnston Oil Field Corp., M. O. 84
Jones & Laughlin Steel Corp. 70
Jones & Laughlin Supply Co. 32
Kellogg Co., The M. W. 151, 152, 153, 154
Kerotest Manufacturing Co. 74
Kidde & Company, Inc., Walter 22
Klinger, Ltd., Richard 180
Koppers Company, Inc. 27, 46
Lane-Wells Company 88
Laughlin Company, The Thomas 220
LeBus Rotary Tool Works, Inc. 218
Leyman Manufacturing Corp. 167
Link-Belt Company 5
Macwhyte Co. 3
Magnet Cove Barium Corp. 37
Manhattan Rubber Division, Raybestos-Manhattan, Inc. 30
Marsh Corp., James P. 83
Maxim Silencer Company 97
McCord Corporation 186
McGraw-Hill Book Co., Inc. 208
McKee & Co., Arthur G. 26
Minneapolis-Honeywell Regulator Co., Industrial Division 34, 35
Minneapolis-Moline 205
Mission Mfg. Company 229
Missouri Dredging Co. 194
Moore Corporation, Lee C. 138
Murdock Tank & Mfg. Co. 213
National Airoil Burner Co., The 200
National Aluminate Corp. 121
National Geophysical Company, Inc. 206
National Radiator Co., The 231
National Supply Co., The 12, 13, 62
National Tube Company 24
Naylor Pipe Company 224
Nicholson & Co., W. H. 200
Nordstrom Valve Division, Rockwell Manufacturing Company 171, 172
Oakite Products, Inc. 201
Oil and Gas Journal, The 196, 233
Oil Well Mfg. Corp. 155
Oklahoma Contracting Corporation 183
Pacific Pumps, Inc. 170, 210
Page Fence Association 219
Parkersburg Machine Company 204
Patterson-Ballagh Division of Byron Jackson Co. 29
Peerless Mfg. Co. 182
Pelican Well Tool & Supply Co. 222
Penberthy Injector Co. 177
Pennsylvania Flexible Metallic Tubing Co. 96
Perfault Brothers 193, 213
Petroleum Electric Power Association 76
Petroleum Rectifying Company 14
Phillips Petroleum Company, Perco Division 198
Phoenix Manufacturing Company 197
Pipeline Cleaners Co. 194
Pittsburgh Coke & Chemical Co. 184
Pritchard & Co., J. F. 131
Pure Oil Company, The 48
Raybestos-Manhattan, Inc., Manhattan Rubber Division 30
Reading-Pratt & Cady Division of American Chain & Cable Co. 47
Reda Pump Company 221
Reed Roller Bit Company 94
Republic Flow Meters Co. 80
Republic Rubber Division of Lee Rubber & Tire Corp. 38
Republic Steel Corporation 19
Rheem Manufacturing Company 4
Rockford Clutch Division of Borg-Warner Company 178
Rockwell Manufacturing Company Inside Front Cover, 40
Rockwood Sprinkler Company 189
Roebling's Sons Company, John A. 75
Royal Bank of Canada, The 168
R-S Products Corporation 41
Rust-Oleum Corporation 95
Santa Fe System Lines 232
Schlumberger Well Surveying Corp. 91
Seismograph Service Corp. 93
Shaffer Tool Works 125
Shand & Jurs Co. 89
Snap-On Tools Corporation 221
Southern Mill & Mfg. Co. 10
Spang-Chalfant Division of The National Supply Co. 12, 13
Spencer-Safford Loadcraft, Inc. 222
Standard Oil Co. of California 82
Standard Pressed Steel Co. 194
Standco Brake Lining Co. 204
Stearns-Roger Mfg. Co., The 248
Strom Steel Ball Co. 226
Sun Shipbuilding & Dry Dock Company 77
Tennessee Eastman Company, Division of Eastman Kodak Company 66
Thermoid Company 49
Thompson Tool Co. 175
Thornhill-Craver Co. 67
Timken Roller Bearing Company 79
Timken Roller Bearing Company, Steel & Tube Division 21
Torrington Company, The 61
Tretolite Company 53
Trojan Construction Co., Inc. 186
Tube Turns, Inc. 85, 86
Tubing Appliance Co. 201
Twin Disc Clutch Co. 98
U. S. Steel Corp. Subsidiaries 24
United States Treasury Department 238
United Supply & Manufacturing Co. 137
Universal Oil Products Co. 148, 149
Victor Products Corp. 200
Warner Lewis Company 194
Watson-Stillman 128
Welex Jet Services, Inc. 102
Westinghouse Electric Corp. 33, 64, 65, 72, 73
Wheeling Machine Products Co. 205
Williamson, Inc., T. D. 188
Willys-Overland Motor, Inc. 230
Wilson Manufacturing Co., Inc. 68
Worthington Pump & Machinery Corp., Multi-Drive Sales Division 81
Yarnell-Waring Co. 225

Central Area

(Continued from page 232)

E. F. Moran 1 Drew Bible, SE NE SE 32-4n-7e, dry, TD 3,025 ft.

Clinton County: Dale Hopkins 1 Niemeyer, NW NW SE 12-2n-4w, dry, TD 3,289 ft.

Douglas County: Carl C. Wright 1 Bragg, NW NE NW 34-16n-9e, dry, TD 698 ft.

A. M. Myers 1 Seward, NE NW SW 26-15n-10e, dry, TD 606 ft.

Effingham County: W. R.-Dena Kuykendall 1 Means, NW SE NE 31-9n-5e, dry, TD 2,240 ft.

Gallatin County: C. E. Brehm-Oil Management, Inc., 1 Leach et al., SE NW NW 18-8s-10e, dry, TD 2,875 ft.

Montgomery County: A. Shiermann 1 Helfers, E½ SE NE 10-7n-4w, dry, TD 1,010 ft.

Richland County: H. F. Robison 1 Kuhl, SW SE SE 33-5n-9e, dry, TD 3,147 ft.

White County: Ashland-Buchman-O'Neal 1 Endicott, SW SE SW 11-7s-10e, dry, TD 3,013 ft.

INDIANA

Peak Drilling Co. has completed its 1 Felthaus, NE NE NW 2-6s-12w, outpost discovery in the area 7 miles northwest of Evansville, in eastern Posey County. The well pumped 132 bbl. of net oil with 40 bbl. of water per day on final production tests. Pay zone is O'Hara lime, opposite which casing is perforated at 2,630-38 ft. Total depth is 2,662 ft. Location is ½ mile

INDIANA SUCCESSFUL WILDCATS

Posey County: Peak Drilling Co. 1 Felthaus, NE NE NW 2-6s-12w, IP 132 bbl., O'Hara 2,630-38 ft., TD 2,662 ft.

Ryan Oil Co. 1 Carmen Flesher Community, NW SE NE 29-6s-14w, IP 7 bbl., Aux Vases 2,782-90 ft., TD 2,792 ft.

INDIANA WILDCAT FAILURES

Daviess County: Arthur Wilson 1 Hains, N½ NE NW NE 9-4n-7w, dry, TD 1,460 ft.

Gibson County: Barron Kidd 1 Lynch, NW NE NW 1-1s-11w, dry, TD 2,104 ft.

N. J. Allen 1 Fischer, NE SW NW 23-3s-9w, dry, TD 1,002 ft.

Knox County: George Engle 1 Mutz, NE SE SE 20-1n-11w, dry, TD 2,187 ft.

Aux Vases Oil Co. et al. 1 Weitz, Location 28-2n-8w, dry, TD 1,643 ft.

Illionis Mid-Continent Co. 1 Wyant, Location 103-2n-8w, dry, TD 1,589 ft.

Owen County: George & Wrather 1 Duling, SW SE NE 22-9n-5w, dry, TD 1,450 ft.

TABLE OF CONTENTS ON PAGE 103

OUR CUSTOMERS

BECOME... *Repeat Customers*

Most of the plants designed, constructed, and put into service by Stearns-Roger during 1950 and 1951 were ***repeat orders***. They included both complete plants and expansions to existing plants for...

- **NATURAL GASOLINE EXTRACTION**
- **DISTILLATE RECOVERY** • **GAS DEHYDRATION**
- **GAS SWEETENING** • **SULPHUR RECOVERY**
- **GAS COMPRESSOR STATIONS**

Write for new bulletin.

Stearns-Roger offers a contract which covers complete engineering and contracting services—fixes total responsibility within one organization. **Engineering**—design and processing work... **Fabrication**—of special processing equipment in our Denver shops... **Field Construction**—with our personnel and equipment.

The advantages of such a contract have been proved thruout the years and on a nation-wide scale. Customer satisfaction is shown by the large number of repeat orders constantly in process.

Stearns-Roger

THE STEARNS-ROGER MFG. CO. DENVER COLORADO

Denver • Houston • El Paso • Salt Lake City

ENGINEERS • CONTRACTORS • MANUFACTURERS

TRU-LAY
Preformed
WIRE ROPE

It handles easier—it's safer
to use. It performs better
and it lasts longer, too.
This means fewer changeovers.
Men who use it seldom switch.
If you haven't tried TRU-LAY
do so on your next job.

ACCO

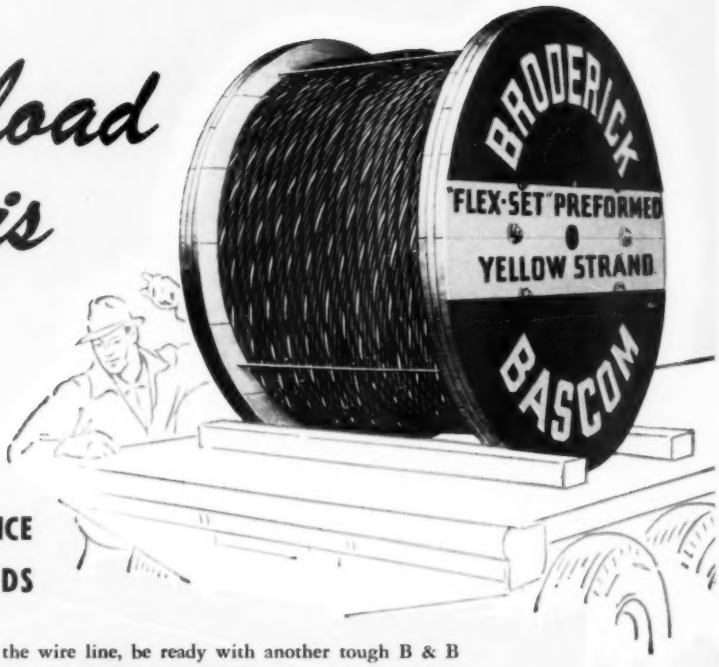
Wilkes-Barre, Pa., Chicago, Denver, Houston, Los Angeles, New York, Odessa, Tex., Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

AMERICAN CHAIN & CABLE
AMERICAN CABLE DIVISION

In Business for Your Safety

ALSO MAKERS OF THE COMPLETE LINE OF
ACCO Registered
WIRE ROPE SLINGS

Get a load of this



...FOR LONG ROPE SERVICE IN THE OIL FIELDS

When it's time to switch the wire line, be ready with another tough B & B rope designed for that particular job. Preformed Yellow Strand Rotary Lines have the stamina to cope with quick starts and stops, high speeds, heavy strings. In the same way Brodril Cable Tool Drilling Lines have the pronounced resiliency and stout abrasion-resistance needed for reaching deep pay zones. You can count on corresponding endurance in other B & B lines. To get a load of assistance specify Preformed Yellow Strand.

Broderick & Bascom Rope Co., St. Louis 15, Mo.

BRODERICK & BASCOM
Yellow Strand
PREFORMED WIRE ROPE

Houston Factory and Branch:
9350 Market Street Road

Los Angeles Branch:
2441 Hunter Street

San Francisco Branch:
899 Bryant Street

The Continental Supply Co.
Mid-Continent Distributors
Stores in All Active Fields

The McJunkin Supply Co.
Charleston, West Virginia